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THESIS

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**A MANAGEMENT CASE ANALYSIS OF THE
DEFENSE CONTRACT MANAGEMENT COMMAND'S
PROCESS ORIENTED CONTRACT ADMINISTRATION
SERVICES (PROCAS) PROGRAM**

George A. Lembrick

December 1993

Thesis Advisor:

Professor William Gates

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1028
94-06759



DTIC QUALITY INSPECTION

1 3 0 1 073

Unclassified

Security Classification of this page

REPORT DOCUMENTATION PAGE

1a Report Security Classification: Unclassified			1b Restrictive Markings	
2a Security Classification Authority			3 Distribution/Availability of Report	
2b Declassification/Downgrading Schedule			Approved for public release; distribution is unlimited.	
4 Performing Organization Report Number(s)			5 Monitoring Organization Report Number(s)	
6a Name of Performing Organization Naval Postgraduate School	6b Office Symbol (if applicable) 36		7a Name of Monitoring Organization Naval Postgraduate School	
6c Address (city, state, and ZIP code) Monterey CA 93943-5000			7b Address (city, state, and ZIP code) Monterey CA 93943-5000	
8a Name of Funding/Sponsoring Organization	6b Office Symbol (if applicable)		9 Procurement Instrument Identification Number	
Address (city, state, and ZIP code)			10 Source of Funding Numbers	
			Program Element No	Project No Task No Work Unit Accession No
11 Title (include security classification) A MANAGEMENT CASE ANALYSIS OF THE DEFENSE CONTRACT MANAGEMENT COMMAND'S PROCESS ORIENTED CONTRACT ADMINISTRATION SERVICES (PROCAS) PROGRAM				
12 Personal Author(s) George A. Lembrick				
13a Type of Report Master's Thesis		13b Time Covered From To	14 Date of Report (year, month, day) 1993 December	15 Page Count 102
16 Supplementary Notation The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
17 Cosati Codes			18 Subject Terms (continue on reverse if necessary and identify by block number)	
Field	Group	Subgroup	Teaming, PROCAS, Process Improvement, Process Control, Quality, Cost Savings, DCMC, Process Oriented Contract Administration Services	
19 Abstract (continue on reverse if necessary and identify by block number) This thesis investigates the extent to which the Process Oriented Contract Administration Services (PROCAS) Program at FMC's Ground Systems Division, in San Jose, California, is reducing Government oversight and increasing Government/contractor communications. This study describes how PROCAS developed in the Defense Contract Management Command, how it was integrated into FMC's Ground Systems Division and reviews the essential elements of the program. It also discusses the effects of the program on Ground Systems Division and the cognizant Defense Plant Representative Office and the program's ideal strategy. The research demonstrates that critical process improvements at Ground Systems Division were attained through the overwhelming commitment of the Ground Systems Division and the Defense Plant Representative Office. This commitment created an environment of open communication and cooperation which enabled Ground Systems Division and the Defense Plant Representative Office to shift their focus from the traditional approach of detection and correction to one of prevention and continuous improvement. The study concludes that the PROCAS Program is an effective method for improving quality and reducing costs and recommends continued support from the defense industry and the Defense Contract Management Command.				
20 Distribution/Availability of Abstract XX unclassified/unlimited same as report DTIC users			21 Abstract Security Classification Unclassified	
22a Name of Responsible Individual Professor William Gates			22b Telephone (include Area Code) (408) 656-2754	22c Office Symbol AS/Gt

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A Management Case Analysis of the
Defense Contract Management Command's
Process Oriented Contract Administration Services (PROCAS) Program

by

George A. Lembrick
Captain, United States Marine Corps
B.S., University of Nebraska at Lincoln, 1979

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1993

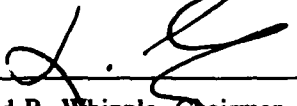
Author:


George A. Lembrick

Approved by:


William Gates, Principal Advisor


CDR Jeffery A. Warmington, Associate Advisor


David R. Whipple, Chairman
Department of Administrative Sciences

ABSTRACT

This thesis investigates the extent to which the Process Oriented Contract Administration Services (PROCAS) Program at FMC's Ground Systems Division, in San Jose, California, is reducing Government oversight and increasing Government/contractor communications. This study describes how PROCAS developed in the Defense Contract Management Command, how it was integrated into FMC's Ground Systems Division and reviews the essential elements of the program. It also discusses the effects of the program on FMC and the cognizant Defense Plant Representative Office and the program's ideal strategy. The research demonstrates that critical process improvements at Ground Systems Division were through the overwhelming commitment of the Ground Systems Division and the Defense Plant Representative Office. This commitment created an environment of open communication and cooperation which enabled Ground Systems Division and the Defense Plant Representative Office to shift their focus from the traditional approach of detection and correction to one of prevention and continuous improvement. The study concludes the PROCAS Program is an effective method for improving quality and reducing costs and recommends continued support from the defense industry and the Defense Contract Management Command.

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DTIC	TAB <input type="checkbox"/>
Unannounced	<input type="checkbox"/>
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By _____	
Distribution / _____	
Availability Codes	
Dist	Avail and/or Special
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I. INTRODUCTION

A. GENERAL

The security environment for the United States has undergone dramatic changes in the last three years. The most significant change is the decreased threat of the former Soviet Union. This collapsed threat has subsequently decreased the amount of dollars available for the Department of Defense (DOD)¹. In the past, the U.S. military budget was based on the following:

The old Soviet threat dominated U.S. military planning. It determined how big the defense budget was, how U.S. forces were structured and how U.S. military equipment was designed. Over half the Cold War defense budget was spent on defending Europe against the Warsaw Pact threat. The arms competition with the Soviets drove spending on U.S. strategic forces. Maintaining U.S. technical superiority was a response to the massiveness of the Soviet threat. [Ref. 1:p. 3]

Paralleling the decreased Soviet threat is anticipated reductions in DOD spending. This decreased purchasing will greatly intensify competitors in the defense industry. The surviving competitors will be those who improve the quality of their goods and services while reducing the cost of acquiring them [Ref. 2:p. 23].

¹Abbreviations and acronyms frequently used throughout this thesis may be found in Appendix A.

In order to improve the quality of goods and services procured by Federal Government, the Defense Contract Management Command (DCMC) has developed a philosophy called Performance Based Management (PBM). This PBM philosophy allows the DCMC to objectively measure performance supporting the appropriate application of scarce resources. Basically PBM is applying the right people...at the right place...at the right time...doing the right things. [Ref. 3]

How will PBM decisions be made? From DCMC's point of view, the declining budget will increase pressure to control unit costs. As a result, DCMC will depend more and more on verifiable data from various sources to support their decisions. [Ref. 3] The different sources that provide input into PBM decision making are: Contractor Risk Assessment Guide (CRAG) Program, which provides the Defense Contract Audit Agency's (DCAA) supporting data; contractor unit cost data; customer input/feedback; internal reviews (i.e., the contractor purchasing system review (CPSR)) and special external reviews which are not controlled by Defense Logistics Agency (DLA) or DCMC (i.e., attorney actions, Inspector General evaluations, and General Accounting Office (GAO) reports). These sources enable the DCMC to make oversight and resourcing decisions. [Ref. 4]

DCMC's long term strategy is to continually improve the processes used to deliver quality products and services to their customers. [Ref. 3] A part of this strategy is a

program which enhances the PBM philosophy, encourages increased communication between Government/industry and provides a framework for the Government/contractor in measuring a contractor's key processes. This program is the Process Oriented Approach to Contract Administration Services (PROCAS). The PROCAS Program provides information in making PBM decisions for the Government and assists the contractor in making decisions by analyzing objective data. DCMC's goals for PROCAS are: [Refs. 5:p. 1 and 6]

- a. Applicable to all DCMC administered contract activities.
- b. A functional orientation to process orientation.
- c. A process to ensure successful completion of contracts.
- d. Founded on professional Government-industry teamwork.
- e. A means to promote consistent treatment of contractors.
- f. A method for continuous verifiable improvement.

PROCAS is a voluntary program for defense contractors. Regardless of contractor involvement, DCMC will apply PROCAS to all administered contracts. PROCAS is applied in an eight step process as outlined below: [Ref. 5:p. 5]

- 1. Government Planning
- 2. Teaming Agreement
- 3. Team Planning
- 4. Process Selection

5. Understanding the Process
6. Selecting the Appropriate Metrics
7. Measuring, Analyzing, Managing Information
8. Adjusting Management Emphasis

By sharing data and mutually agreed upon measurement criteria of contractor key processes, DCMC envisions that increased Government-industry communication will provide an environment for making informed decisions regarding continuous process improvement(s). [Ref. 7]

This thesis will provide the Government and the defense industry with an analysis/study that objectively evaluates the PROCAS Program at FMC's Ground Systems Division (GSD). The end result will be to determine if this voluntary program is viable for FMC.

B. OBJECTIVE OF RESEARCH

The research objective is to analyze the extent to which the DCMC's PROCAS Program is impacting FMC's Ground Systems Division and the Government's Defense Plant Representative Office (DPRO).

C. SCOPE OF THESIS

This thesis will be a case study. The effort will be directed to analyzing the PROCAS Program implemented at FMC's GSD located in San Jose, California. The study will be augmented by interviews/opinions of key Government/GSD

officials regarding the **effectiveness** and **efficiency** of the PROCAS Program.

D. RESEARCH QUESTIONS

Primary Research Question: To what extent is DCMC's PROCAS Program reducing Government oversight and increasing Government/contractor communications.

In support of the primary question, the following subsidiary questions were established:

1. What are the essential elements of the pilot PROCAS Program and how has the program been implemented thus far in FMC?
2. To what extent has the PROCAS Program changed the processes at GSD?
3. To what extent has the PROCAS Program changed the way the cognizant DPRO reviews GSD's processes?
4. Is measuring the return on investment of PROCAS beneficial?
5. What conclusions may be drawn from GSD's implementation of the PROCAS Program which could be used to benefit other Department of Defense Contractors?

E. RESEARCH METHODOLOGY

The primary method of data gathering for this thesis was on-site visits and interviews with representatives of FMC's GSD in San Jose, California and the cognizant DPRO.

Additional information was obtained from telephone interviews and correspondence with officials from DCMC and Defense Contract Management District West (DCMD-W). Current

articles in professional journals and publications provided key supporting information.

F. ORGANIZATION OF THE STUDY

This thesis consists of seven chapters which are outlined below:

1. **Introduction:** The introduction provides a brief orientation of the PROCAS Program, the objective of the thesis, research questions and an outline of the remainder of the thesis.

2. **Background:** This chapter provides historical background information on the DCMC, the creation of the PROCAS Program, and specific background on FMC's GSD.

3. **PROCAS features:** This chapter describes the essential elements of the PROCAS Program.

4. **FMC implementation of the PROCAS Program:** This chapter describes how GSD implemented the PROCAS Program.

5. **Effects of GSD's PROCAS participation:** This chapter identifies the processes that GSD is attempting to improve and how cognizant DPRO officials perceive these process changes.

6. **An analysis of the PROCAS Program's potential effectiveness:** This chapter analyzes the PROCAS Program's effectiveness in promoting contractor efficiency.

7. **Conclusions and Recommendations:** This chapter contains conclusions derived from the research and

recommendations for future study of the PROCAS Program and related areas.

II. BACKGROUND

A. INTRODUCTION

This chapter will describe how DCMC conceptualized PROCAS and provide the background of how GSD decided to implement PROCAS. Prior to discussing the inception of the PROCAS Program, the CRAG Program must be described. CRAG was the first attempt between industry and Government to increase cost-effectiveness.

B. CRAG BACKGROUND

On 15 July 1985, President Reagan signed Executive Order 12526. It appointed a Presidential Blue Ribbon Commission headed by David Packard (referred to as the Packard Commission) to examine the Defense Department's overall system of command, its systems for determining requirements and the administrative procedures for acquisition and procurement programs. [Ref. 8:p. 34] In June 1986, the Packard Commission published its final report. It concluded that contract violations would be reduced if Government contractors established more effective internal control systems and the means to show that these systems were effective. [Ref. 9:p. i] In response to the Packard Commission Report, the CRAG Program was developed jointly by the Under Secretary of Defense for Acquisition, the Inspector General, DOD, the Director of the

Defense Contract Audit Agency, and the defense industry. [Ref. 9:p. i] The goals of the program were described by the Secretary of Defense in an October 1988 memorandum to Defense Agencies and Departments. They are to strengthen contractor internal controls through self-governance and increase the efficiency and effectiveness of DOD oversight effort. [Ref. 10:p. 15] Through a series of joint DOD and defense industry meetings, CRAG was approved by the Government and defense industry and was published in October 1988. Contractors who demonstrated that they implemented internal control systems that met CRAG control objectives could receive less direct Government oversight. [Ref. 9:p. i] Through the CRAG Program, the DOD invited industry to assess their internal control systems on a **voluntary basis**. [Ref. 10:p. 15]

Having contractors improve their internal control systems through self-governance sounded like a great idea. However, the CRAG Program revealed a variety of problems. These included: industry's inability to see the potential reward from the program, the CRAG Program would not justify the additional overhead monies to avoid risk, lack of information about the program and the chronic mistrust between Government and industry. [Ref. 11] For example, a 1990 memorandum from a National Contract Management Association (NCMA) meeting on CRAG indicated several reasons for industry's reluctance to participate in the CRAG Program:

- a. A belief that it would not lead to reduced oversight.
- b. There is nothing in CRAG that will change the fundamental mistrust between DCAA and industry.
- c. DCAA field workers won't implement the program fully since their careers depend on making findings of noncompliance.
- d. The benefits don't outweigh the implementation costs, since more overhead will be required in the way of additional internal auditors. [Ref. 12]

The CRAG Program was officially approved by the Secretary of Defense on 29 November 1988. However, many members of the defense industry saw no significant changes. [Ref. 13:p. 9] A senior defense industry executive described the relationship between the Government and the defense industry in May 1990:

I have never seen the defense industry the way it is right now. Morale is low, companies are losing hundreds of millions of dollars and there is widespread anxiety about the Defense budget. We are thrust together in a relationship that requires contractors, the Defense Department and Congress to work together. But instead, we operate in an environment of suspicion, fear, and even some danger. [Ref. 13:p. 52]

Contractors today perceive these same problems. Therefore, they are hesitant to participate in any voluntary program that does not guarantee a reduction in Government oversight or an increase in profits via cost reduction. [Ref. 14]

C. THE DCMC STRUCTURE

In June 1989, Secretary of Defense Cheney submitted a Defense Management Report (DMR) to President Bush that

recommended improvements to the Defense acquisition process. [Ref. 15:p. 28] One of the improvements Secretary Cheney recommended was consolidating all contract administration functions performed in DLA and the various military departments. The purpose of this consolidation was outlined by Mr. Cheney:

The consolidation management of contract administration will provide uniform procurement policy, permit the upgrading in the quality of the CAS work force, reduce overhead and payroll costs. The consolidated management also permitted the CAS structure to be streamlined from nine regions into five districts. [Ref. 15:p. 31]

On 26 February 1990, DCMC was formed and charged with DOD-wide contract management support, engineering and program support, quality assurance, and contractor payment activity. [Ref. 16:p. 25] A simplified organizational chart in Figure 1 shows where DCMC fits within DOD.

DCMC's mission is to administer Defense Contracts for the military services, other Department of Defense Components, Federal Civil Agencies and, when authorized, to Foreign Governments. DCMC's mission elements are: [Ref. 13:p. 19]

- a. To assure contractor compliance with cost, delivery, technical, quality, and other terms of the contract.
- b. To accept products on behalf of the Government.
- c. To pay the contractor.
- d. To provide program support.

Figure 2 depicts that DCMC is broken down into 5 districts within the United States and one district for international

contracts. These designated districts areas are: West, South, Mid-Atlantic, Northeast, and North Central. When the DCMC deems that a significant level of oversight is necessary, DPRO acts as the on-site eyes and ears at the contractor's place of performance. For smaller contracts that require less oversight, a Defense Contract Management Area Operations (DCMAO) office provides oversight for several contracts within a designated area. Regardless of size, the cognizant DPRO or DCMAO is responsible for the contract administration function of an assigned contract. These contract administrative functions are outlined in the Federal Acquisition Regulation (FAR), part 42, subpart 42.302 as depicted in Appendix B.

Due to the number of contracts and the value of these contracts, the DCMC has determined that a DPRO would be co-located with FMC's GSD in San Jose, California. Figure 3 shows the structure for the DPRO located at FMC's Ground Systems Division.

D. THE PROCAS BEGINNING

Having responsibility for all DOD-wide contracts enabled the DCMC to develop PROCAS by combining the best practices and procedures from the Defense Logistics Agency's Defense Contract Administration Services (DCAS) and military service plant representatives. The initial elements of PROCAS were formed by combining the Defense Logistics Agency's In-plant

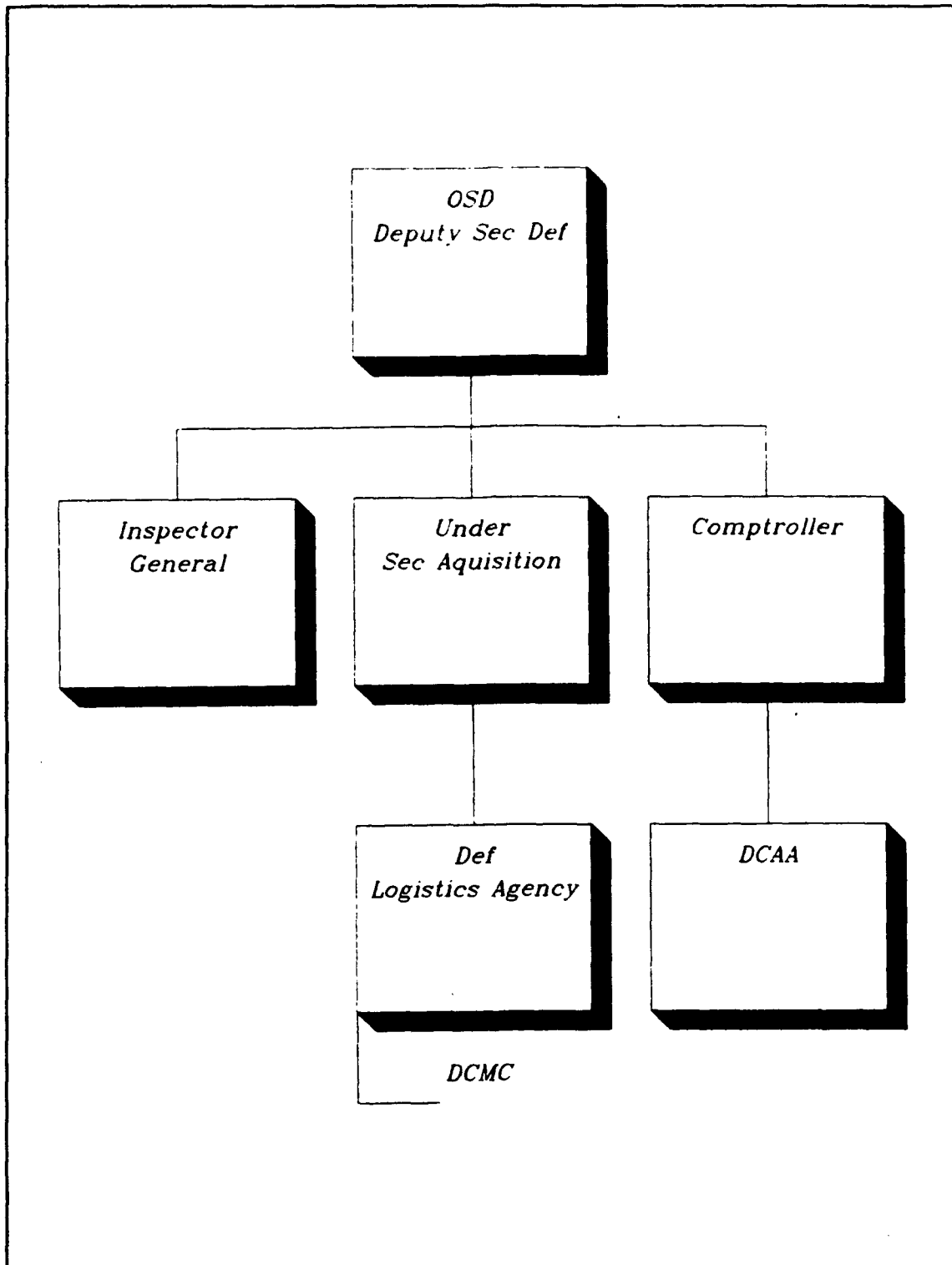


Figure 1. Overview of the DCMC within the Department of Defense

Source: Federal Organization Service, 1993.

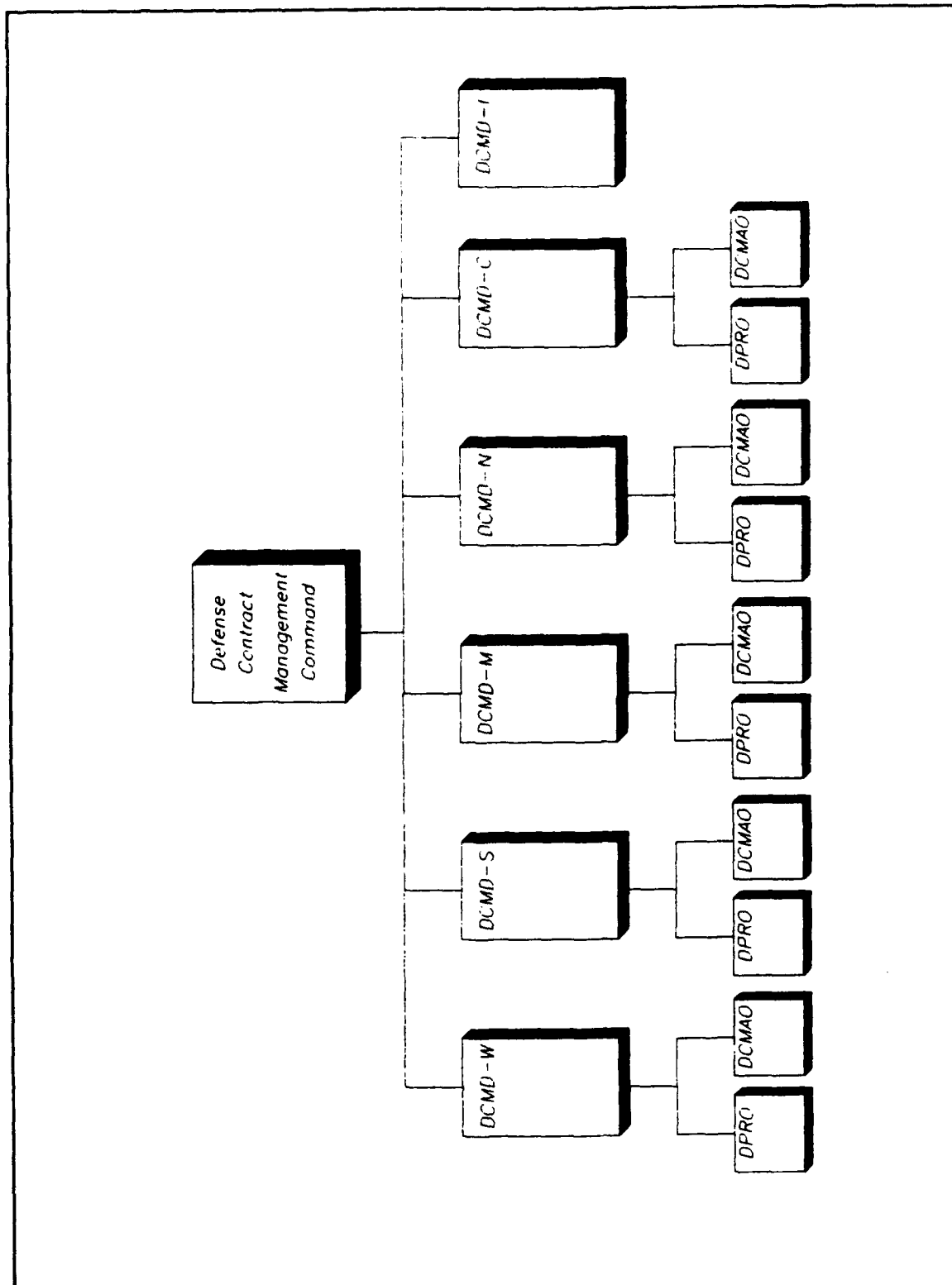


Figure 2. Simplified Organizational Chart of DCMC
Source: Federal Organization Service, 1993.

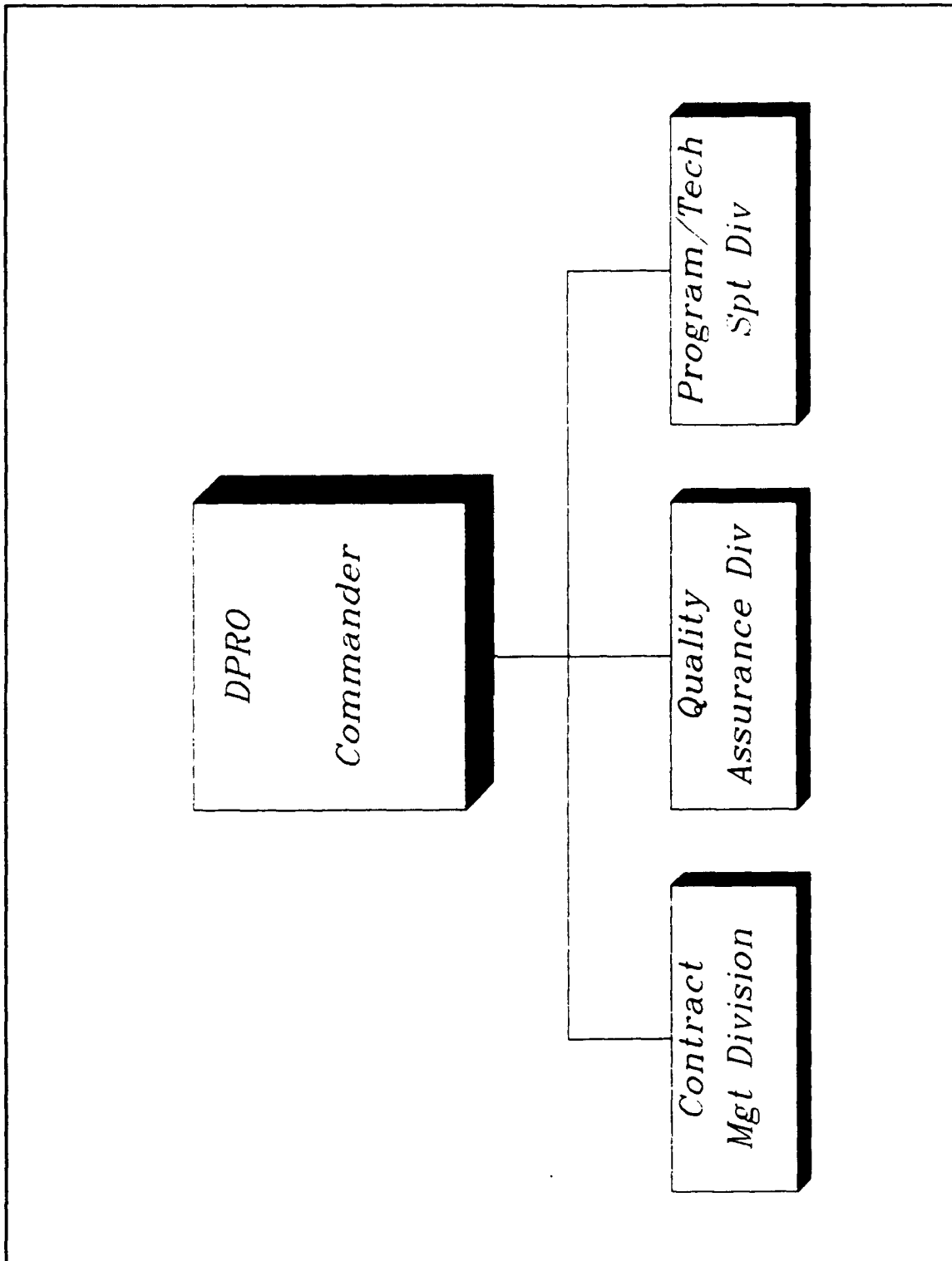


Figure 3. Simplified Organizational Chart of the Defense Plant Representative Office
Source: DPRO located at FMC.

Quality Evaluation (IQUE) and the best of the military Services' quality self-governance programs. [Ref. 4]

The catalyst for PROCAS was to seek continuous improvement of Government oversight and successful contract completion. Seven corporations participated in testing and developing the initial PROCAS concepts. The corporations that participated in the pilot program were: TRW, Hughes, FMC, Northrop, Rockwell, Martin Marietta and Magnavox. The DCMC's intent in having these corporations participate was to provide a cross section within the Defense Industry (i.e., airframe, electronic, software, missile, and armored vehicle). [Ref. 3] Chapter III will discuss the components of PROCAS.

As indicated by Mr. Robert P. Scott, Executive Director of Contract Management at DCMC, PROCAS would be implemented at all contract administration offices (CAO). Implementation of PROCAS is defined as occurring when: A District PROCAS implementation plan has been developed, teaming agreements are in place at all DPROs and at selected contractors at all DCMAO offices, and team planning is complete or underway at all DPROs where teaming agreements were made. [Ref. 6] Navy Admiral Straw, Director, Defense Logistics Agency (DLA) discussed further cost savings potential for both the Government and defense contractors through PROCAS in a brief to General Powell, Chairman of the Joint Chiefs of Staff. Specific cost savings include: reduced scrap rates, better subcontractor

prices/quality, overhead control and reduced work-in-process inventories. [Ref. 3]

As the elements of the PROCAS program are spread throughout the DCMC's five districts, contractors are ready to implement the PROCAS Program in the immediate future. PROCAS is viewed as a way to improve their processes, reduce their costs and increase profits. [Ref. 3]

E. FMC - GROUND DIVISION INFORMATION

FMC is a diversified corporation involved in the following areas: agricultural/industrial chemicals, defense systems, machining and equipment, and precious metals. Figure 4 shows a simplified structure of FMC.

Within the Defense System Group, the Ground Systems Division in San Jose, California is the only FMC group that has implemented PROCAS concepts into daily operations. Figure 5 depicts where the Ground Systems Division fits within the Defense System Group.

The principal business operations for GSD are tracked military vehicles for the United States Army and allied governments. [Ref. 17:p. 11] Currently the major programs within GSD are: the Bradley Fighting Vehicle (BFV), the multiple launch rocket system (MLRS) and the armored gun system (AGS). [Ref. 11]

As of June 1993, the current major contract workloads were:

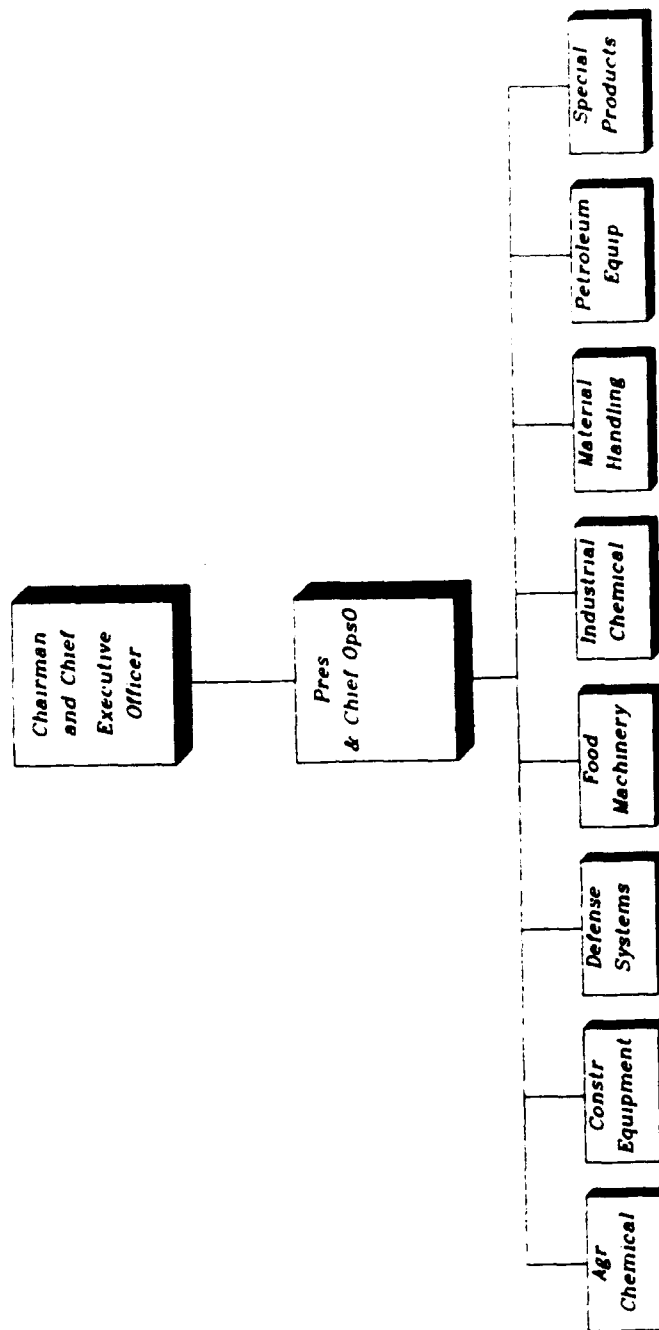


Figure 4. Simplified Organizational Chart of the FMC Corporation
Source: Current FMC Organizational Structure dated January 1985.

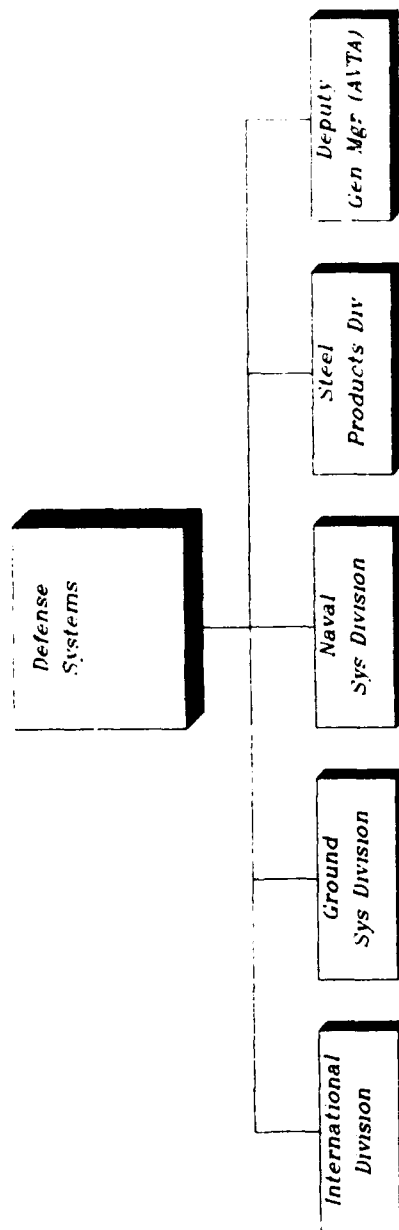


Figure 5. Simplified Organizational Chart of the FMC's Defense Systems Group Headquarters

Source: Current FMC Organizational Structure dated January 1985.

Program	Number of contracts (in production)	Dollar Value
BFVS & MLRS	30	6.7 Billion
AGS	1	.8 Billion
Misc-Includes R & D	131	.8 Billion
Total	162	8.3 Billion

Source: DPRO's management information report.

F. THE GROUND DIVISION'S PROCAS EVOLUTION

In 1989, FMC forecasted the Department of Defense's downsizing. This forecast was not merely done in a crystal ball. Rather, the downfall of the Berlin Wall, the unsuccessful coup attempt against Gorbachev in the Soviet Union and the peace dividend savings discussions within Congress made FMC acutely aware of significant reductions in future defense contracts. Foreseeing this change within DOD via Congress, FMC began emphasizing Total Quality Management (TQM). Through TQM, FMC changed their focus to the ultimate customer of the product ... the soldier in the field. This change of focus made FMC become more concerned with quality. Moreover, FMC realized that producing higher quality items at no additional cost would help them compete for future contracts. [Ref. 18]

Since implementing TQM in 1989, GSD has continued to improve the quality of their products. GSD's TQM efforts

eased the transition of folding the PROCAS Program into their business philosophy. [Ref. 19] The results of GSD implementing PROCAS are discussed in Chapter V.

G. SUMMARY

CRAG provided defense contractors the voluntary opportunity to improve their contract performance, reduce and improve Government oversight, and most importantly enhance Government/industry relations via improved communications. Unfortunately, contractors could not see cost savings with CRAG nor did they believe there would be less Government oversight. However, with PROCAS, defense contractors are anxious to team with the Government in identifying cost saving steps to improve their profits. By reducing costs, defense contractors can see themselves making money while remaining price competitive.

III. PROCAS PROGRAM ESSENTIAL FEATURES

A. INTRODUCTION

One of the major concerns identified by the Packard Commission was the need for improved oversight of defense contractors. [Ref. 13:p. 17] To improve oversight, the DCMC established the Performance Based Management philosophy as discussed in Chapter I. The need for improved oversight has always been a priority for the DCMC. This was reflected by Major General Henry, the previous Commander of the DCMC, on 29 June 1992 when discussing the importance of Performance Based Management:

PBM is the Defense Contract Management Command management philosophy that links contractor performance with the appropriate level of CAS...to determine risk and make decisions on how many CAS people are required. [Ref. 20]

Driven by budget constraints, Congress' oversight and customer expectations, the DCMC's **vision** is to continuously improve its contract management and support its **strategy** of improving the processes used to deliver quality products and services to its customers. To support DCMC's vision and strategy, PROCAS was developed to encourage increased communication between Government and industry and to directly measure key contractor processes. [Ref. 5:p. 1]

Data sharing between the Government and the contractor forms the framework for mutually agreeing upon criteria for measuring improvements in a contractor's process. [Refs. 3 and 5:p. 1] Therefore, PROCAS provides the information/data and the visibility for the Government and the contractor to make informed decisions. This chapter will discuss elements of the PROCAS program and how DCMC envisions implementing the program.

B. PROCAS ELEMENTS

Prior to discussing the PROCAS structure, the key elements of PROCAS must be understood. The key elements are: tasks, processes and systems. The following definition of these elements is provided:

Tasks are actions taken by an individual such as filling out a form, cutting a piece of material, etc.

Processes are a series of tasks leading to a common objective and satisfying a requirement, such as producing an estimate, making a handle, etc.

Systems (sometimes called process families) are a natural grouping of related processes and controls that lead to larger objective, such as the telephone system, a flight control system, or the estimating system. [Ref. 5:p. 2]

Understanding these key elements provides an insight into how one process can compliment another, or be the result of another. Figure 6 shows the interrelationship between

complimentary and supporting processes. The generic enterprise core areas necessary to satisfy contract requirements are:

- a. Business Planning and Control includes the processes used to manage normal business activities and provides supporting business management services to the enterprise.
- b. Program Planning and Control includes the processes used to manage and control program cost, schedule, performance and technical changes. This area also includes the processes used to integrate issues to determine program and/or contract impact.
- c. Product Definition and Design includes the processes used to transform customer requirements into a producible design and to support, as needed, new production processes.
- d. Product Delivery includes the processes used to plan, schedule, fabricate, assemble, test, deliver and accept contract end items. These processes convert the product design into deliverable end items accepted by the Government.
- e. Product Support includes the processes used to ensure customer satisfaction after product delivery. These processes provide post-delivery products and services to support the end item after delivery to the user. [Ref. 5:p. 3]

Moreover, grouping processes within the above areas enables the Government and the contractor to select the functions that will benefit a particular contract area. Figure 7 depicts the processes that may be associated with a system/area. Understanding the various processes within a group is another way of assisting the Government and the contractor in determining which processes are complementary, which are supporting and which are intersecting. [Ref. 5:p. 3]

By analyzing the processes, DCMC has shifted from fixing the defect to improving the process. [Ref 21:p. 6] This is depicted in Figure 8.

C. ROLES AND RESPONSIBILITIES

Prior to discussing the steps involved with PROCAS, it is important to delineate the roles and responsibilities. In the following paragraphs contract administration services (CAS) refers to either a DPRO's or a DCMAO's CAS responsibilities. [Ref. 5:p. 4]

- a. Contractors are responsible for complying with all contract terms and conditions, notwithstanding plans and efforts directed toward improved performance.
- b. Headquarters DCMC is responsible for overall PROCAS policy and outside agency executive level contract.
- c. Commanders at all levels within DCMC are responsible for implementing PROCAS command wide. The command roles are important because of the cross functional teaming approach that PROCAS encompasses.
- d. DCMD Commanders will ensure:
 1. Effective planning is accomplished at all levels for PROCAS implementation.
 2. Personnel receive the training, tools, and other support to effectively implement PROCAS.
 3. CAO Commanders encourage and facilitate teaming of personnel in facilities where there is cross-functional involvement.
 4. CAO Commanders coordinate implementation strategies to ensure consistent implementation, with special emphasis on contractor corporate operations which cross DCMD area boundaries.
 5. Contractors, customers, and DCAA personnel are adequately informed about PROCAS and encouraged to

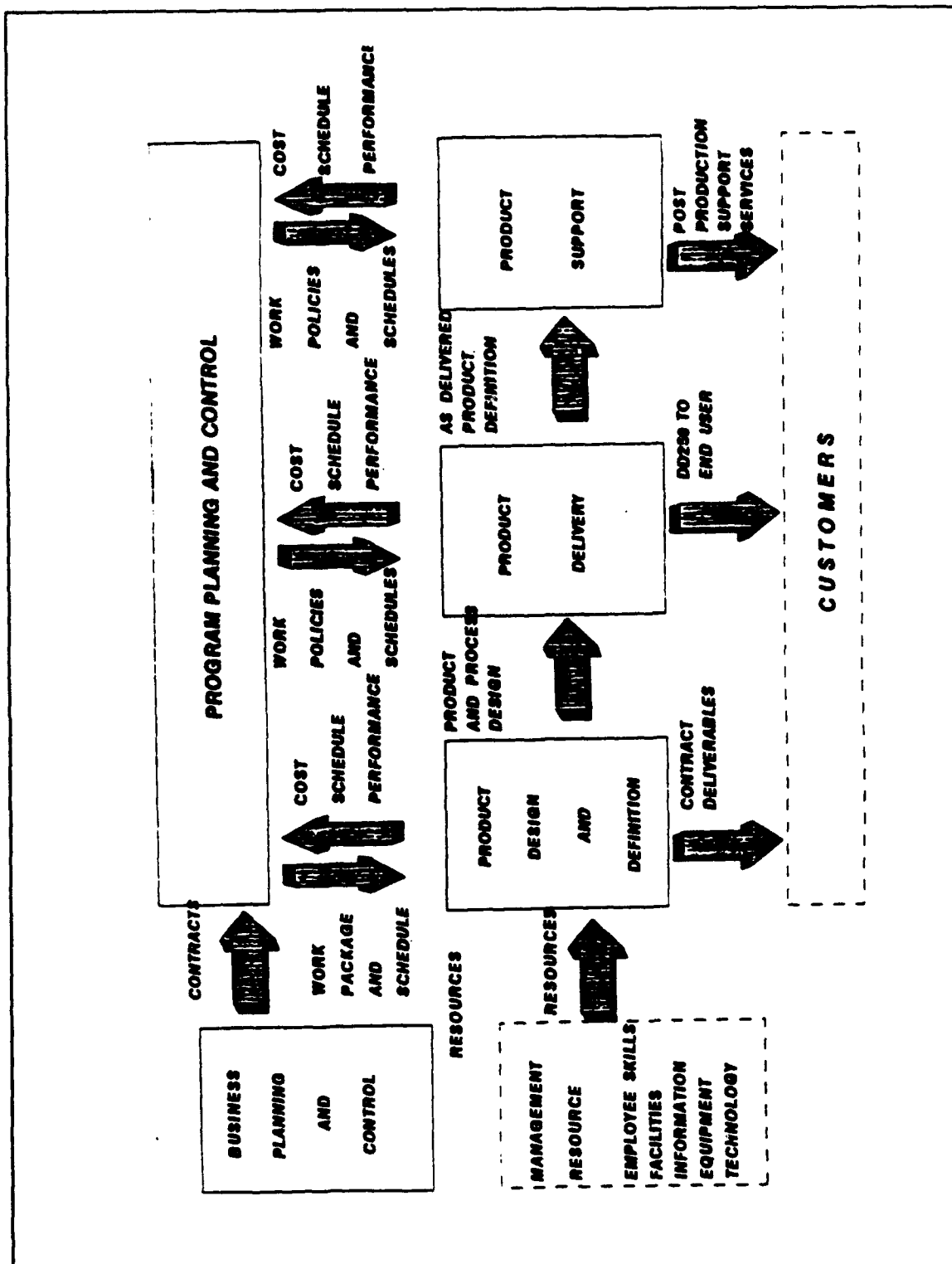


Figure 6. Process Relationships
 Source: DLA's PROCAS Instructor's Guide dated 26 February 1993.

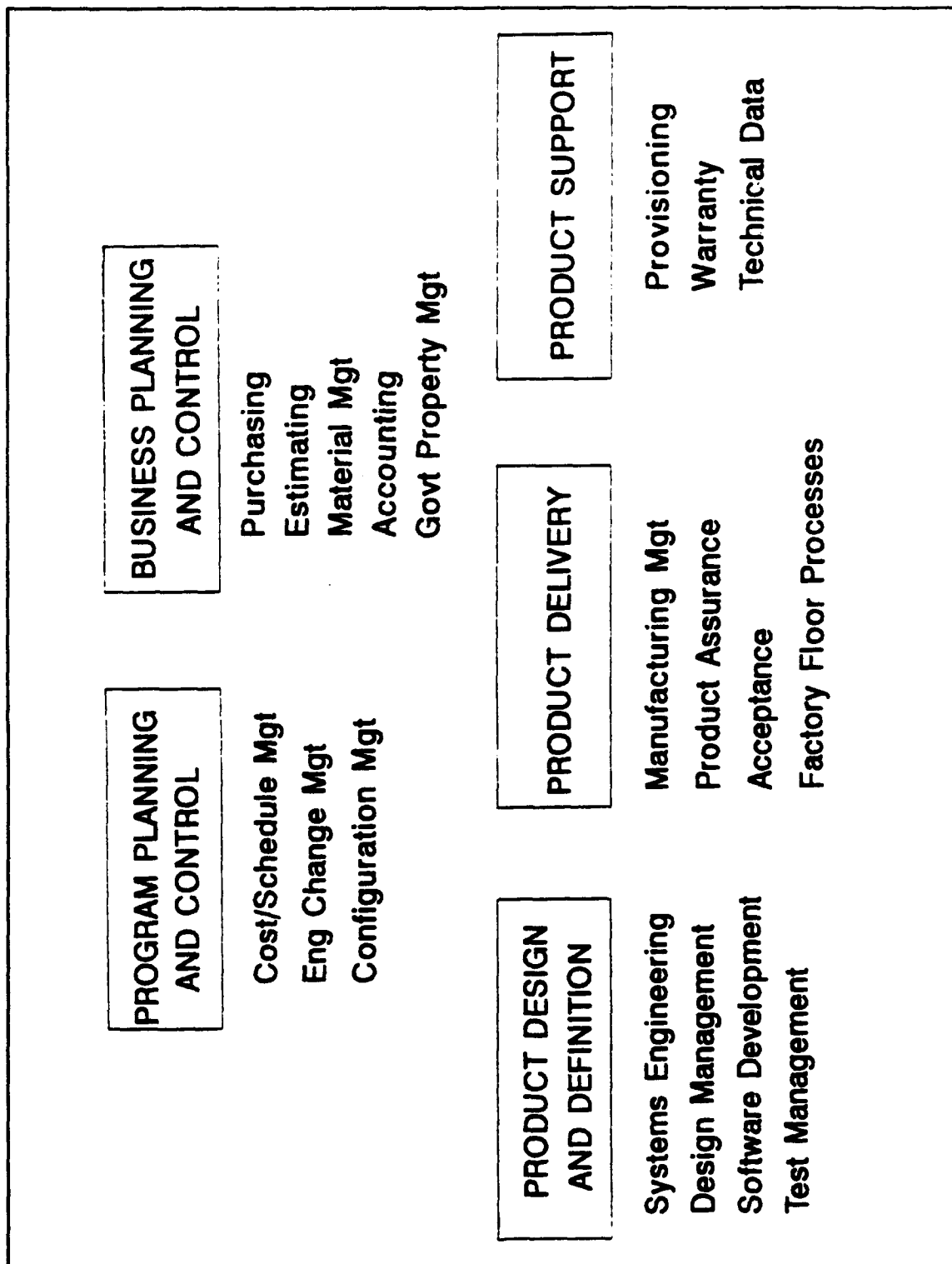


Figure 7. Processes Associated with Systems/Areas
 Source: DLA's PROCAS Instructor's Guide dated 26 February 1993.

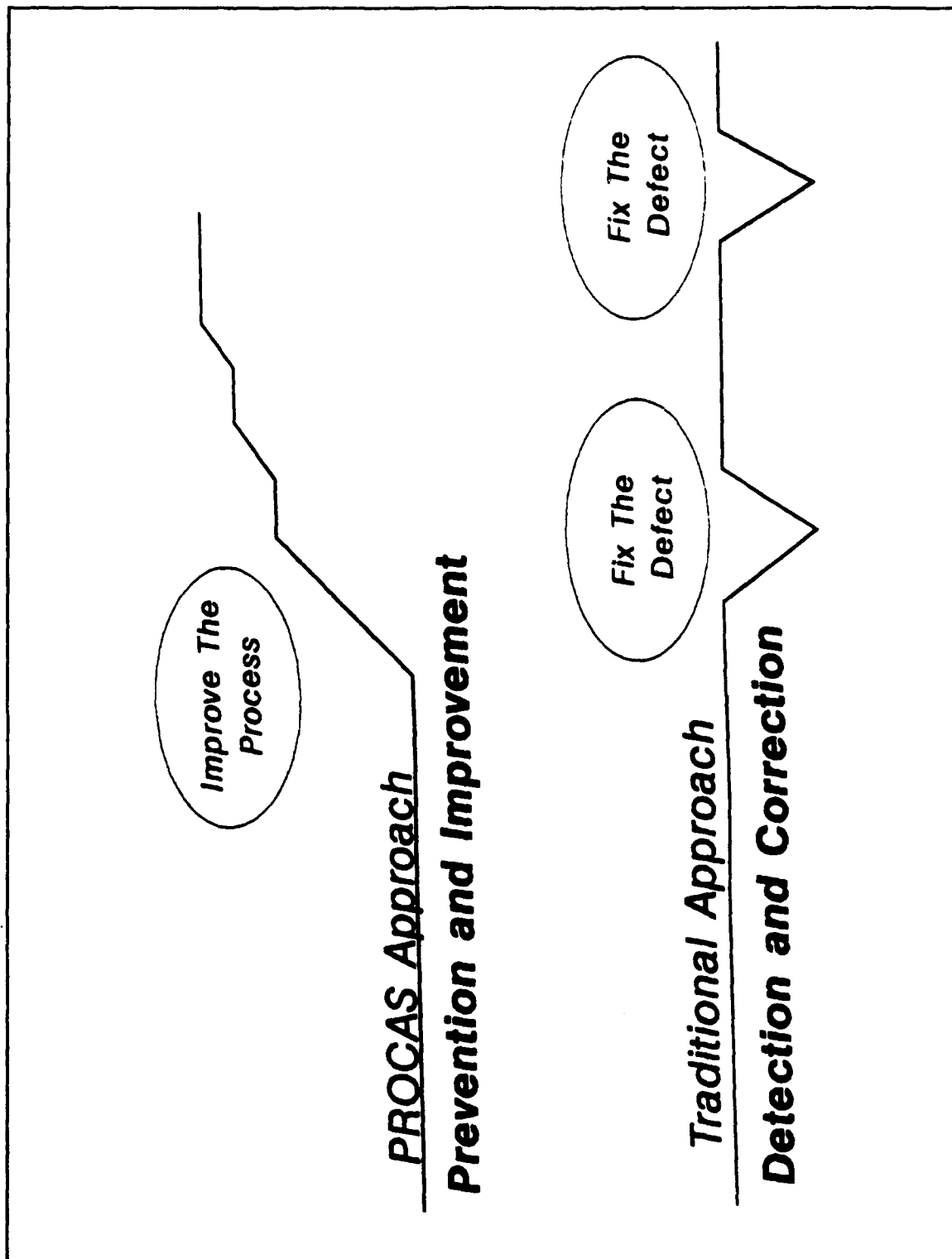


Figure 8. PROCAS Approach versus Traditional Approach
Source: DLA's PROCAS Instructor's Guide dated 26 February 1993.

actively participate.

e. CAO Commanders will ensure:

1. Personnel are adequately trained for PROCAS implementation.
2. Teaming is encouraged and carried out to the greatest extent possible among CAO personnel.
3. Contractors, customers, and DCAA personnel are adequately informed about PROCAS, and encouraged to actively participate.
4. Management attention and resources are adjusted based upon demonstrated and measurable contractor performance.
5. A plan is developed and maintained to establish the overall CAO strategy for implementing PROCAS.

f. The Government Process Specialist will:

1. Represent the Government, and therefore, will perform independent surveillance as required to protect its interest.
2. Validate data independently as required.
3. Work with the PROCAS team to identify process improvements.
4. Team with other affected Government specialists.
5. Ensure timely and effective corrective action of noncompliance problems by the contractor.

The roles and responsibilities will become clearer upon review of the PROCAS process.

D. THE PROCAS PROCESS

The PROCAS process, as mentioned earlier (refer to Figure 8), emphasizes prevention and improvement rather than the

traditional approach of detecting a problem, fixing it but never understanding why the problem existed. The PROCAS processes emphasize statistical process control, process analysis and data collection to monitor progress and make continuous improvements. Figure 9 identifies the eight-step processes that provide flexibility to allow tailoring across commodity lines, management systems and industry cultures. [Ref. 21:p. 6]

PROCAS's eight steps are discussed below:

1. **Government Planning** is the first step. DCMC personnel determine which contractors to approach in implementing PROCAS. All major contractors that have a co-located DPRO will be approached by the DPRO. The DCMAO will prioritize PROCAS involvement of smaller contractors based upon such factors as input from customer(s), criticality of the contractors' product, how widespread the products are used among weapon systems and/or in the DOD community, and the magnitude of the improvement opportunity. [Ref. 21:p. 8]

2. **Teaming agreement** occurs when the Government (DPRO or DCMAO) approaches the contractors that have been identified from step 1 and discusses a teaming agreement. The teaming agreement will involve the contractor, the customer, the Government and other agencies for example the Defense Contract Audit Agency (DCAA).

However, the DCAA is limited in their ability to participate with the teaming. [Ref. 21:p. 8] During Process

The PROCAS Process

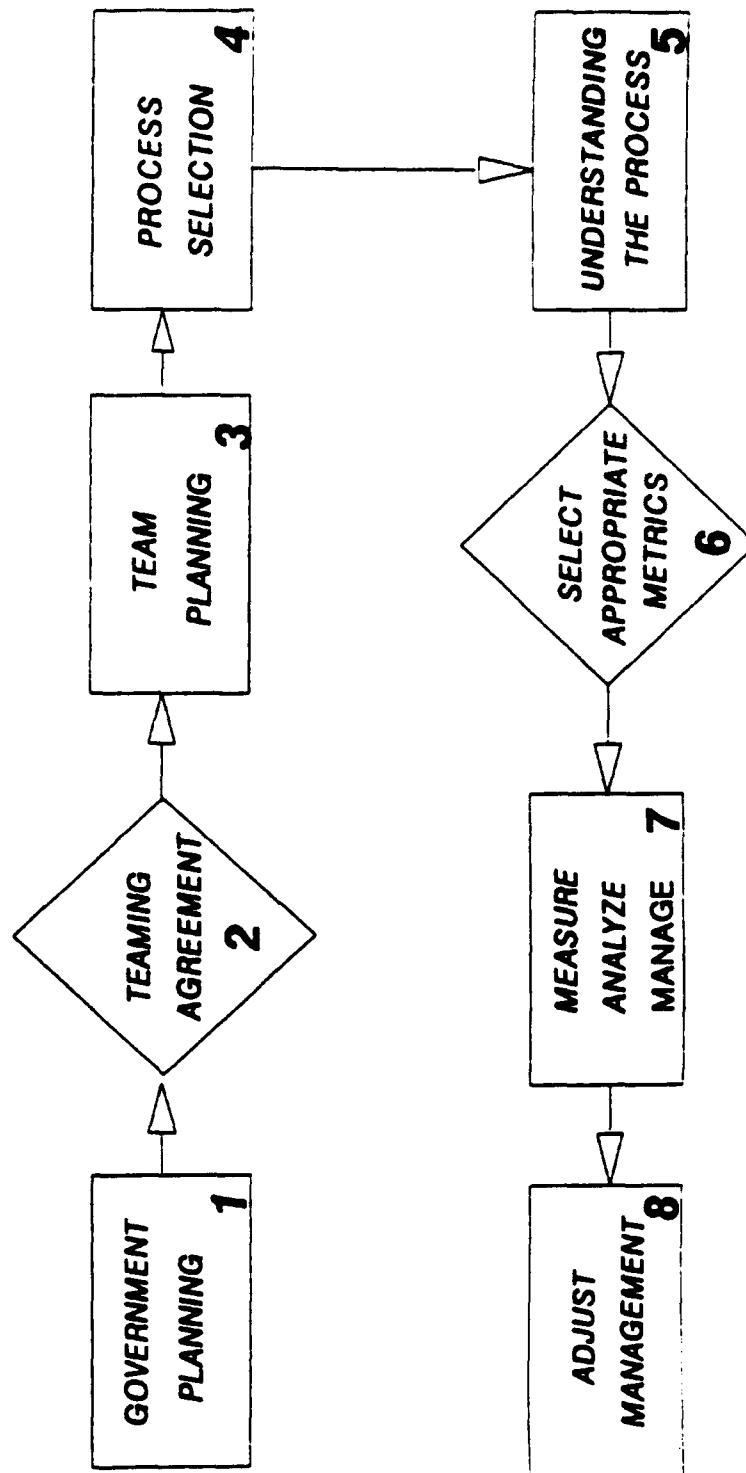


Figure 9. The Steps of PROCAS

Source: DLA's PROCAS Instructor's Guide dated 26 February 1993.

Action Team (PAT) participation, DCAA auditors may serve as advisory members of contractor PATs and any Government PATs which focus on contractor systems of internal controls.

Auditor participation in teaming is outlined below:

DCAA's role as independent financial advisor to the contracting officer precludes our being voting participants in final contractor management decisions. However, auditors should support PAT activities enhancements. They should also identify any past issues which the PAT needs to consider or any prospective issues which should be evaluated. For each PAT, the field audit office manager should communicate in writing the role of DCAA, that this role is required by professional standards and the fact that DCAA will continue to provide an independent audit opinion based on representative tests of internal control systems. DCAA auditors may be fully participating team members of Government PATs which focus on implementation of Government regulations or oversight processes. However, DCAA auditors **should normally not be** members of advisory boards or steering committees related to contractor systems or operations. [Ref. 22]

The teaming agreement can be either formal with a written, signed document or informal with a handshake sufficing. However, these agreements will not be legally binding for the Government or provide an avenue for the contractor to deviate from or modify the terms and conditions of the contract. [Ref. 21:p. 8]

An important aspect of this step is that the team will use a common data base to jointly identify processes and establish measures. The impetuous of the agreement is to allow the Government and industry to jointly emphasize teamwork and continuous improvement. However, if a contractor decides not

to participate in a teaming agreement, the DPRO or DCMAO may proceed unilaterally with the PROCAS Program. [Ref. 21:p. 8]

3. **Team planning** is the third step and is the key to successfully implementing PROCAS. Planning starts with clear, understandable objectives. Moreover, these clear objectives are supported by a master plan/schedule that: identifies and schedules training needs and activities, identifies contractor processes, identifies contractor process owners, identifies Government process specialists, prioritizes processes, defines and understands processes, develops process measures and performance goals, selects methods for tracking process improvements and corrective actions, selects methods of process assessment and selects a common database to measure/manage. [Refs. 5:p. 6 and 20:p. 8]

4. **Process selection** starts by selecting processes critical to satisfying the contractual requirements. The number of processes selected will vary from contractor to contractor. Criteria for prioritizing and selecting processes for analysis may include: criticality of the end item, dollar value of the process, impact if failure occurs, visibility or interest to the customer or requirement for assessment by Government regulations. [Ref. 5:p. 6]

5. **Understanding the process** allows the maximum flexibility and identifies process ownership. In this step, the team analyzes the process(es). The team will also determine: the process objective; the internal or external

customers or suppliers; the process flow; the contract and process requirements. [Ref. 21:p. 8]

To assist in understanding the processes, the team will identify the sequence of tasks and review the relationship of each task. For complex processes and products, the team may elect to prepare process flow chart(s). The appropriate tools to analyze a process must be established and understood at the local level. [Ref. 5:p. 7]

6. Selecting appropriate metrics can only be accomplished if a process is understood. Upon understanding the process, the PROCAS team can define objective measures of the process(es). For agreement on objective measures, it is essential that process measures be a joint venture between the Government and the contractor. The measures include repetitive measures of performance to gauge efficiency and effectiveness and periodic measures to gauge whether processes are stable, mature and predictable. [Ref. 21:p. 9]

The PROCAS team works together to identify a minimum level of performance based on contract requirements. Moreover, the contractor is encouraged to establish goals that require innovation and exceptional effort. As process performance becomes more consistent, stable and predictable, the process becomes what is labeled as "sophisticated". This sophistication enables DCMC to predict future process performance. The ability to predict future performance

provides DCMC with the ability to predict risks associated with a process. [Refs. 5:p. 7 and 21:p. 9]

7. **Measure, analyze and manage** provides the PROCAS team data and analysis to manage and improve processes by taking prompt and appropriate action. The Government and the contractor are concerned with detecting and preventing deficiencies that are identified through statistical analysis. This provides opportunities for improving process performance. [Ref. 21:p. 9]

Confidence in data accuracy must be established. Without accuracy, the data that are recorded, collected and statistically analyzed will invite the PROCAS team to make inappropriate action decisions. To determine if a process has attained the sophisticated status, process data will be analyzed at established intervals to assess process stability, trends, or the likelihood of a continuous improvement opportunity (CIO). [Ref. 5:p. 10]

CIOs are simply a way a PROCAS team member identifies an opportunity for improvement. It may be written or verbal. Actions taken in response to a CIO are optional. DPRO/DCMAO personnel should avoid directing or telling a contractor how to change a process in order to improve it. If the CAO tells a contractor to make a change, the CAO has in fact made a constructive change to the contract for which the Government is liable.

Another way of managing process improvements/corrections is through submitting corrective action requests (CAR). CARs are submitted to the contractor by the CAO when contractor noncompliance is noted. There are four levels of CARs. Depending upon the severity of the noncompliance, they may be either verbal or written. [Ref. 5:p. 10]

8. **Adjust management emphasis** is the last step. In this step, the PROCAS team adjusts its oversight as required, decreasing oversight of processes that demonstrate a high level of sophistication. As sophistication increases, the Government will rely more on the contractor's process control data, only sampling outputs to verify the control data. Dependent on the level of sophistication, the DPRO/DCMAO will adjust its oversight and audit frequency. [Ref. 21:p. 9]

When processes fall below the sophistication level, contractor management and the Government will become more involved. This two party involvement will result in process improvement teams to correct the problem area(s). Until a contractor meets performance requirements, the Government will increase surveillance, including direct inspection of the product. [Ref. 21:p. 9]

E. SUMMARY

Through continuous process improvement, it is clear that DCMC's PROCAS Program is a viable option for defense contractors to improve their quality while simultaneously

lowering their costs. Understanding the roles and responsibilities of the contractor and the Government enables them both to be more responsive to the ultimate customer...the sailor, soldier, airmen, or Marine. However, continuous process improvement can not be attained without two-way communications between the Government and the contractor.

IV. FMC'S IMPLEMENTATION OF THE PROCAS PROGRAM

A. INTRODUCTION

This chapter will provide background information on FMC's Ground Systems Division (GSD) prior to implementing the PROCAS Program. This will be followed by an overview of how GSD has incorporated PROCAS in daily operations.

B. GROUND SYSTEMS DIVISION PRIOR TO PROCAS

As discussed in Chapter II, in 1989 GSD embarked on a new philosophy called Total Quality Management (TQM). The definition and objectives of TQM are:

TQM is defined as a holistic system of organization management which involves all employees in a process of continuously improving the organizations' ability to accomplish its mission. Through this definition, TQM objectives are summarized as meeting customer requirements each time, every time by continuously improving all processes and eliminating all forms of waste through elimination of root causes of all errors. [Ref. 23:p. 12]

Moreover, the TQM philosophy provided GSD with the necessary tools to develop a "Total Quality Vision." The vision developed for GSD became:

Be the United States Armed Forces' most valued supplier of systems, subsystems, and services for the ground vehicle market. This will be accomplished by:

- a. Understanding the market place and helping the customer shape the future.
- b. Providing superior value.
- c. Making FMC a great place to work.

- d. Having successful financial performance through excellent execution. [Ref. 24]

To realize this vision, GSD developed the following management principles and applied them in daily operations:

1. Combining teamwork, technology and tools to do work right the first time.
2. Continuously improving processes to eliminate waste.
3. Achieving consistent quality through prevention, not correction.
4. Establishing meaningful measure criteria.
5. Meeting customer requirements.
6. Recognizing quality performance. [Ref. 24]

GSD's TQM philosophy was not implemented overnight; rather it evolved through a lengthy educational process from the top down, involving all employees.

Early in 1991, the DPRO Commander, Lieutenant Colonel Blair Peterson, United States Army and Tom Rabaut, the Director of Operations at GSD, shared a vision that incorporated both the Government and the contractor working together for continuous improvement. This vision became reality when a joint process improvement effort was developed that emphasized improvement in manufacturing processes. [Ref. 18]

In April 1991, the DCMC via the Western District (DCMD-W) approached GSD to implement a pilot program called Performance Based Management (PBM). The proposed offer was accepted by GSD. DCMC's PBM pilot program did not have a framework. The

Government (DPRO) and the contractor (GSD) were to jointly establish a continuous measurement approach. By implementing the pilot program, GSD expanded their initial joint process improvement program from the manufacturing system to other systems, to include quality management, engineering management, and others as depicted in Figure 10. [Ref. 18]

Early in 1992, GSD and the other contractors involved in the PBM pilot program met with DCMC. The major discussion was twofold: (1) controlling and analyzing processes to make continuous improvements, and (2) the importance of teaming between the Government and the contractor. Towards the end of 1992, the best elements of the pilot program were pooled into the current PROCAS structure. [Ref. 18]

As a result of GSD's prodigious TQM efforts prior to implementing the PBM pilot program, there were no significant changes for GSD. LtCol Peterson's and Mr. Rabaut's vision established what the pilot program was striving to develop: continuous process improvement via Government and defense contractor teaming. GSD's vision coupled with their TQM philosophy enabled them to easily implement DCMC's PROCAS Program. [Ref. 18]

The next sections will provide an overview of GSD's key players involved in implementing PROCAS. What DCMC calls PROCAS, GSD refers to as Performance Based Management (PBM).

Performance Based Management Key Processes

KEY PERFORMANCE MEASURES	QUALITY						HUMAN RESOURCES	
	QUALITY MANAGEMENT		ENGINEERING MANAGEMENT		OPERATIONS MANAGEMENT		PROCUREMENT MANAGEMENT	
	CONTRACT MANAGEMENT		PROGRAM MANAGEMENT		INFORMATION RESOURCES		HUMAN RESOURCES	
	Cost of Quality		Engineering Project Management System		Performance to Budget		Purchasing Improvement Project	
	Preventative Maintenance Program		Engineering Project Management System		Vehicle Flow		Supplier Information System	
	Vehicle Quality Indicators		IR&D Process		FAC Vehicle Inspection		Supplier Certification	
LEADERSHIP	Project Action Team		Concurrent Engineering		Quality Leadership Award		Recognition	
	Corrective Action Requests		Field Support Process		DPHO Vehicle Inspection		Purchased Material Shortages	
	Training		Presentations		Wholesome Environment		Training	
	Customer Service Index		Program Reviews		Customer Service Index		Employee Development	
	Selling		Communication		Process Improvement		Safety	
	Safety		Training		Quality of Software Changes		Response Time	
CUSTOMER	Software Maintenance Cost		Cost Management System		Time required to resolve problems		Benefits	
	Marketing and Scheduling		Systems Assessment		Quality of Software Changes		Training	
	Systems Assessment		Communication		Process Improvement		Selling	
	Customer Service Index		Program Reviews		Customer Service Index		Employee Development	
	Employee Development		Presentations		Safety		Training	
	Training		Presentations		Safety		Training	

Figure 10. GSD's Systems
Source: GSD's Director of Total Quality.

C. IMPLEMENTING PBM IN GROUND SYSTEMS DIVISION

To achieve the goals of implementing PBM into daily operations, GSD developed a mission statement and clear objectives. The mission statement and objectives are as important today as they were two years ago. They are: [Ref. 25]

1. **Mission Statement:** Develop and implement a performance based management plan through the identification of critical processes so that continuous improvement can be achieved.
2. **Objectives:**
 - a. Develop and achieve measurable continuous improvement process objectives containing measures of cost, quality, customer, schedule, leadership and human resources. These measures will be reflected in everyone's major responsibility areas (MRA).
 - b. Identify the performance of critical processes and subprocesses.
 - c. Identify improvement opportunities and take appropriate actions.
 - d. Improve support to internal and external customers.
 - e. Build a stronger, working relationship between FMC and the DPRO.

As a by-product of TQM training, GSD created various teams/committees and identified key personnel to provide important information/decisions in implementing PBM. The responsibilities of the teams, committees, and key individuals are delineated below: [Refs. 24 and 25]

1. **Executive Steering Committee:** The Executive Steering Committee includes the Director of each functional

unit/system in GSD. Their responsibilities are to: provide a vision of the future, be champions of Total Quality, and set a clear Total Quality strategy for the organization.

2. **Quality Council:** The Quality Council is composed of key individuals at GSD who address quality improvement objectives in manufacturing, engineering, and services. They ensure all the conditions of TQM are being planned and acted upon. The responsibilities of the council are:
 - a. Provide an infrastructure that will allow GSD to approach Total Quality from a divisional perspective by providing: direction, consistency of purpose, common language and implementation of strategy.
 - b. Act as a vehicle for two-way communication between the Executive Steering Committee/Quality Council and the rest of GSD organization.
3. **Director of Total Quality:** The Director of Total Quality leads the Total Quality Process for the GSD. His/her responsibilities are: provide the Quality Council with leadership and direction; oversee the PBM education process in the division; track and measure overall progress toward PBM; provide and track organizational milestone for PBM; and establish quality recognition programs.
4. **Guidance Teams:** Guidance Teams are composed of three to six key individuals from each PBM system and the DPRO. These members have diverse skills, sufficient authority and a stake in the process improvement efforts. The members are also familiar with process improvement. The team's responsibilities are:
 - a. Provide training and guidance to Champions and Project Action Teams (PAT) on Performance Based Management and especially guidance how to identify processes and subprocesses.
 - b. Monitor and assess the success of the PBM processes and subprocesses.
 - c. Determine needed resources (i.e., people or time).
 - d. Assist in the selection of team leaders, champions, and quality advisors.
 - e. Assist in the selection of project action teams.

- f. Meet regularly with teams and champions.
 - g. Provide an environment to develop and improve the system that allows team members to bring about change.
5. **Champion:** A Champion is an individual who is knowledgeable in the process to be improved. His/her responsibilities are:
- a. Set goals and refer the project to a team if necessary.
 - b. Monitor, measure and collect data.
 - c. Report progress to the guidance team.
6. **Project Action Team (PAT):** The PAT consists of individuals from GSD, and the DPRO where appropriate, who are knowledgeable and involved employees/Government representatives. They meet regularly to work on a particular project process improvement(s). The responsibilities of the team are:
- a. Address the issue or problem to achieve realistic goals which are established to ensure the chance of success.
 - b. Identify critical processes and subprocesses.
 - c. Develop a plan for process improvement.
 - d. Identify customer needs and concerns.
 - e. Collect meaningful data.
 - f. Develop the process flowchart.
 - g. Develop appropriate solutions by attacking the root causes of problems.
 - h. Monitor the solution to the problem.
 - i. Evaluate the process or subprocess.
7. **Team Leader (PAT):** The PAT Team Leader is an individual who runs the team, arranges logistical details, and facilitates meetings. He/she is knowledgeable in the process to be improved. His/her responsibilities are:

- a. Set goal(s) and refer project to a team if necessary.
 - b. Monitor, measure and collect data.
 - c. Serve as the contact point for communication between the team and the rest of the organization.
 - d. Encourage full participation of team members.
 - e. Conduct meetings and coordinate activities.
8. **Quality Advisor (PAT):** The Quality Advisor is a person trained in the scientific approach and in working with groups. He/she keeps the team on track. His/her responsibilities are:
- a. Help facilitate the team's work, but do not participate directly in the team's activities.
 - b. Instruct the team in scientific tools.
 - c. Lead the team members in problem solving activities.
 - d. Present the corrective action plan developed by the PAT to the Guidance Council.

By establishing the above teams, leaders and key individuals, GSD extended continuous improvement within the division.

D. THE EVOLUTION OF PBM

The Executive Steering Committee and Director of Total Quality were instrumental in implementing PBM. Because of the direction and support of the Executive Steering Committee, the Director of Total Quality has been able to achieve tremendous success in creating an infrastructure that meets the mission statement and objectives of PBM. Moreover, the preponderance of success in implementing PBM is attributed to the Director

of Total Quality's continuous education efforts. Educating the GSD organization in the PBM system combined with GSD's TQM Vision, has enhanced the commitment to excellence. [Ref. 18]

With the PBM infrastructure in place, Guidance Teams are now responsible for implementing and providing oversight for the PBM system. The composition and qualifications of the Guidance Team members has not changed, however team members now have authority to make recommended changes in the process under review. The Guidance Team's charter is: [Refs. 18 and 25]

- a. Breakdown functional barriers.
- b. Provide a link between FMC/DPRO and process improvements efforts.
- c. Provide decision and resource support.
- d. Identify project goals.
- e. Provide guidance for PATs.
- f. Implement changes PAT teams are not authorized to make.
- g. Select Team Leaders, Champions, and Quality Advisors.
- h. Meet regularly with teams/champions.
- i. Host monthly reviews.
- j. Maintain listing of PATs.
- k. Insure changes made by Teams are followed up.
- l. Provide recognition for meeting/exceeding PBM objectives.

A Guidance Team can be formed for many reasons. The team must strive to quantify the extent of a problem to determine

the degree to which the process can be improved. The following are examples why a process may be selected as critical: [Ref. 25]

- a. High level managers complain about a process.
- b. The process received a poor rating in an external audit (i.e., the DPRO's quality assurance audit).
- c. The business has changed and the process is out-of-date.
- d. Adequate measurements are not in place.
- e. The rating of the process is considerably poor.
- f. Customer complaints.
- g. Warranty returns.
- h. Repetitive problems.
- i. Missed deadlines.
- j. Low productivity.
- k. Excessive overtime.

Figure 11 illustrates the PBM process improvement plan. When output becomes desirable, the accompanying process is then accepted (graduated). As shown, there are two paths for process improvement, with or without PAT involvement. If the PAT route is taken, GSD has four simple rules...Plan (P), Do (D), Check (C), and Act (A). These rules provide the steps a PAT must perform before a process improvement can be accepted. The other route for process improvement is through an assigned Champion. The assigned Champion, as discussed earlier, monitors and measures data against established goals. When data become desirable, the process is accepted. [Ref. 18]

In order to track critical processes within a key system, the Guidance Team measures the success of a system. The PBM system is measured on a 10 point index scale. The criteria used for the index scale are outlined in the six steps below:
[Refs. 24 and 25]

1. The first step is to determine if a process is defined. A process is defined by a process identification worksheet. It is essential to determine the following information:
 - a. Determine if there is joint FMC/DPRO interest in the process. GSD will proceed with the work sheet even if there is no DPRO interest.
 - b. Identify the system that contains the critical process to be evaluated (i.e., Quality Management).
 - c. Identify the key performance measurement that will be used (i.e., cost, scheduling, or quality).
 - d. Identify the members of the PAT that will be evaluating the process.
 - e. Submit the process's name to be evaluated (i.e., Cost of Quality).
 - f. Describe the process.
 - g. Rationalize why the process is critical.
 - h. Identify symptoms of the problem(s) that justifies a process review.

If the process can be defined, **a point is assigned.**

2. The second step is to determine if the process can be mapped. At a minimum, a flow diagram must be completed showing all major steps of the process. If the process can be adequately mapped, **a point is assigned.**
3. The third step is to identify the key performance measure(s). A measurement must establish a quantifiable method of representing the status of a process. If a measurement is established, **a point is assigned.**

PBM Process Improvement Plan

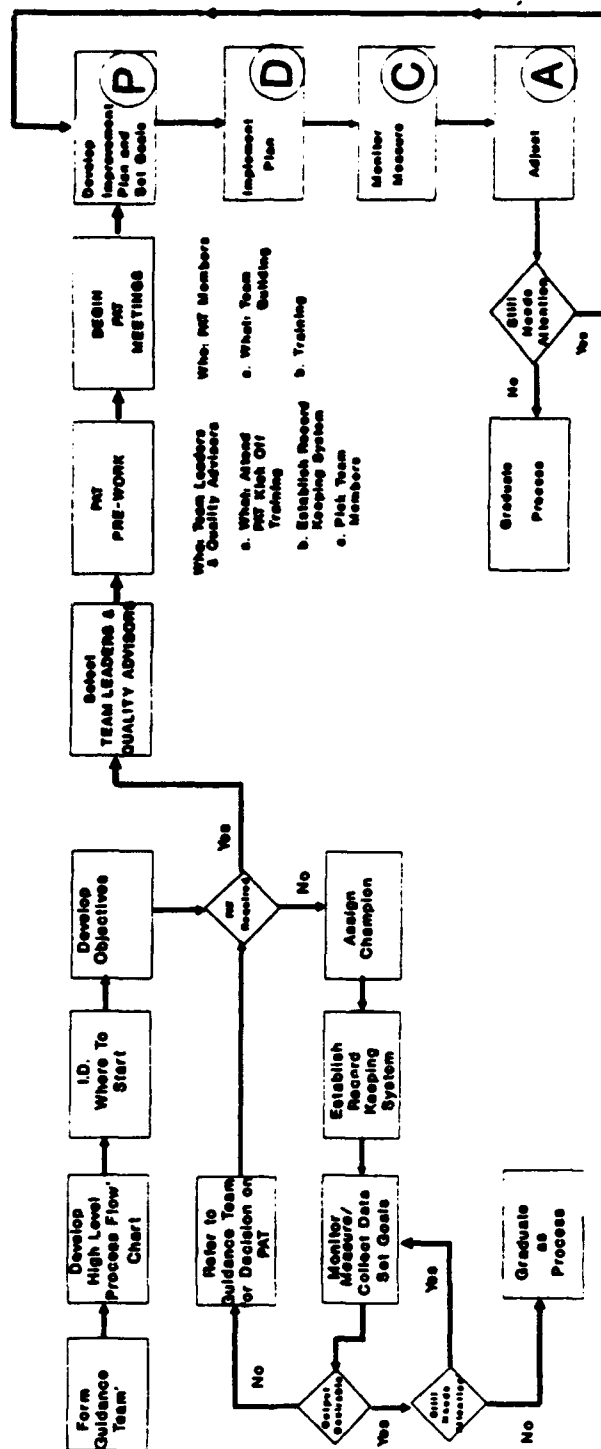


Figure 11. Process Improvement Plan
Source: GSD's Director of Total Quality.

4. The fourth step is to determine what goals have been established. If process improvement expectations have been established and scheduled over a specific period of time, **a point is assigned.**
5. The fifth step is to determine if an improvement plan has been completed. The improvement plan will entail the course of action to be taken to improve the process based on previous goals and measurements. If a improvement plan is completed, **a point is assigned.**
6. The sixth step is to evaluate progress of the process against an established goal(s). To measure the progress toward a goal, it must be graphically represented by either a line chart, pie chart, bar graph or a matrix table. Data representations should include at a minimum the goal, name of a process, unit of measurement, frequency of measurements and progress. However, steps one through five must be completed prior to evaluating the process and assigning points. **Point award for step six ranges from one to five points.**

Figure 12 provides a review of the discussed process development criteria.

Once a process accumulates eight to ten points, the process is determined acceptable. However, process acceptance does not reduce Guidance Team oversight. If a process is unacceptable, the PAT continues to review the process for improvement. All critical processes are tracked. During each quarter the Team Leaders of a PAT or Champions submit their process index(es) to the respective Guidance Team. In turn, the Guidance Team(s) consolidate system's performance(s) and submit the information to the Director of Total Quality. After review, the Director of Total Quality publishes and distributes this information throughout the division for information or action. [Ref. 18]

Process Development Criteria

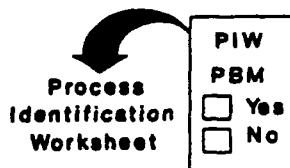
Process Identification Criteria

Example:

(A) Process Defined = 1 Point

A Process identification work sheet has been completed to all criteria described on the backside of the sheet. The criteria includes the following:

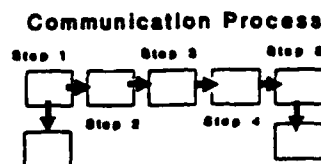
- 1) Link to Performance Based Management (PBM)
- 2) PBM System
- 3) PBM Measurement: Cost, Quality, Schedule
- 4) PBM Process Name
- 5) Description
- 6) Rational
- 7) Symptoms of Problems



PIW PBM
<input type="checkbox"/> Yes
<input type="checkbox"/> No

(B) Process Mapped = 1 Point

At a minimum a high level flow diagram will be completed showing the major steps of the process.



(C) Measurements Established = 1 Point

A measurement must be established to offer a quantifiable method of representing the status of your process.

Measurements Examples:

- Cost of Quality as a percent of sales
- Orders shipped on time/ total orders

(D) Goals Set = 1 Point

Process improvement expectations have been established and scheduled over a specified period of time.

Goal
20% by June 1, 1992
50% by September 1, 1992
75% by January 2, 1993

(E) Improvement Plan Completed = 1 Point

A written plan that details the course of action to be taken to improve the process. This plan must be based on your previously described goals and measurements.



(F) Progress Toward Goals = 1 to 5 Points

Progress towards goals must be graphically represented by such methods as line charts, pie charts, bar graphs, matrix tables, etc...

Minimum requirements for data representation should include goals, name of a process, unit of measurement, frequency of measurements, and depicting progress.

Criteria A thru E must be completed before points can be awarded in this area.

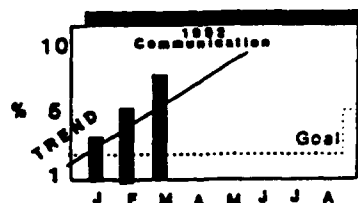


Figure 12. Process Development Criteria
Source: GSD's Director of Total Quality.

E. SUMMARY

Figure 13 depicts GSD's method of doing "business". It parallels the eight steps discussed in PROCAS. Additionally, GSD's TQM philosophy coupled with its PBM system has provided the working tools necessary to determine if a critical process is effective, efficient, under control and adaptable. As a result of focusing on key processes and subprocesses, GSD has been able to automatically institute a quality improvement cycle.

Performance Based Management

"A Process Oriented Approach to Contract Aministrative Services."

PRO-CAS

- 1 Government Planning
- 2 Teaming Assessment
- 3 Team Planning
- 4 Process Selection
- 5 Understanding the Process
- 6 Select Appropriate Metrics
- 7 Measure Analyze Manage
- 8 Adjust Management Emphasis

FMC-PBM

- Western District Formed PBM Pilots
- FMC Joined Pilot
- DPRO/FMC Development Joint Approach
- Select Processes Across Systems
- G.T. Define Processes VIA PBM Process ID Work Sheets
- Guidance Teams Select Metrics & Processes Map
- PDCA Cycles On Going

Figure 13. GSD's PBM Compared to PROCAS
Source: GSD's Director of Total Quality.

V. EFFECTS OF PROCAS PARTICIPATION

A. INTRODUCTION

For the past two years, GSD and the DPRO, under the command of Lieutenant Colonel Donald Yates, United States Army, have collaborated to establish a joint contractor/Government approach that would improve the process and reduce Government oversight. This effort has intensified over the last year. The success of this joint effort was reinforced by Lieutenant Colonel Yates' comments to GSD during a formal signing of a PROCAS teaming agreement on 5 February 1993:

We look at the total processes across the board and work collectively together to accomplish the job in a more effective way and lower our oversight, increase your efficiency, and together produce a better product.

This chapter will identify the processes GSD is attempting to improve, the results of process improvements, and the success DPRO officials at FMC attribute to PROCAS.

B. GSD'S SYSTEM IMPROVEMENTS

As discussed in the previous chapter, Guidance Teams are formed within different systems to improve a process(es). Later, as a result of different Guidance Teams' inputs, GSD establishes a PBM Matrix. The matrix identifies the process(es) within different systems to be measured via one of the PBM measurement criterion (i.e., cost, quality, schedule,

customer, leadership, and human resource). While forming the Guidance Teams, the DPRO reviews/evaluates the intended process(es) to determine if it warrants Government participation. The major criteria required for the DPRO to participate is whether the process is essential for performing the contract. If it is, the DPRO will contribute the necessary resources (i.e., time and personnel). [Ref. 11]

DCMC's PBM pilot program and the resulting PROCAS objectives were compatible with FMC's TQM efforts. As a result, GSD was able to identify critical processes with minimal effort. Additionally, FMC's TQM approach expedited step 4 of PROCAS, Process Selection. Normally this is a time consuming ordeal for contractor and Government representatives. [Refs. 18 and 19]

In this case, GSD developed a comprehensive list of critical processes involving several systems. Lieutenant Colonel Yates' DPRO team then reviewed these processes and selected those that would both benefit from a teaming approach and have a significant impact on a particular program. As a result of teamwork and true professionalism, PBM Matrix:Stage 1 was created as depicted in Figure 14. The shaded areas represent GSD/DPRO teaming. The PBM Matrix is labeled Stage 1 because GSD and the DPRO feel process improvement(s) is **continuous**. Therefore, it is GSD's and the DPRO's intent to dedicate resources to another PBM Matrix as processes in Stage 1 become stable (mature). The new process matrix has been

developed and labeled Stage 2. GSD's PBM Matrix: Stage 2 is seen in Figure 15. [Refs. 11 and 18]

To ensure continuous effort in process improvements, a new stage will be developed jointly and overlap a current stage. [Ref. 18] For example the PBM Matrix:Stage 2 was developed and revealed in the middle of 1993. Stage 3 will be developed and revealed sometime during 1994. Of course GSD and the DPRO do not have the personnel to simultaneously address processes identified in Stages 1, 2, and 3. Therefore, GSD and the DPRO will evaluate and freeze the processes in Stage 1, then dedicate personnel to other critical processes. An overview of the number of processes in Stage 1 and 2 are provided:

	GSD	GSD/DPRO	TOTAL
STAGE 1	40	29	69
STAGE 2	49	28	77
TOTAL	89	57	146

Source: A GSD/DPRO brief on 27 September 1993.

Worth noting is the increase of processes involved in Stage 2. During Stage 1, GSD observed that Guidance Teams have become more experienced and increasingly confident in their approach to dealing with process problems. This has enabled GSD to increase the evaluated processes. Unfortunately, the DPRO's personnel constraints limit the number of processes they can evaluate. Lieutenant Colonel

PERFORMANCE BASED MANAGEMENT MATRIX: STAGE 1						
SYSTEM	COST	QUALITY	SCHEDULE	CUSTOMER	LEADERSHIP	REV:4
Quality	Quality Assurance Procedures	FIQ Applied	Classical Training	Customer Advice	TQM Communication	T.Q. Training
Engineering	Cost Management	R & D Identification	Reliable Input	Customer Satisfaction	TQM Communication	Emp. Recog.
Manufacturing	Inventory to Stock	Ver. July & Test	Class. Mgt.	Customer Satisfaction	TQM Communication	Waste Minimization
	Quality Assurance	Attendance	Vehicle Plans			Health & Safety
Procurement	Communication	Supplier G. Actions	Proc. Imp.	Control Tests	TQM Communication	Emp. Recog.
Contracts						
a. Estimating		Prep. of Estimate Input		Prep. of SF1411	Propose Communication of Info	Est. Syst. Training
b. Administration	Classical Data Qd	Cont. Admin Training	Defining Contract Actions	Cont. Request Response	TQM Communication	MRA Process
Information Resources	Software Maintenance	Change Management	Problem Resolution	Customer Satisfaction	TQM Communication	Emp. Development
Programs						
a. BFV	SCP Process	TOPs	SCP Process	QARs	TQM Communication	Emp. Development
Human Resources	Workers Compensation	Access Control	RF Process	Termination	TQM Communication	Office Safety
	HMS Reports					
Financial	Long Financial Input Data	QCP	May/Oct Forecast	Customer Satisfaction	TQM Communication	Emp. Development
	May/Oct Forecasts	AFE	Accounts Payable			
		Accounts Payable	EAC/PSR			

Figure 14. PBM Matrix:Stage 1

Source: GSD's Project Manager of Divisional Total Quality.

SYSTEM		PERFORMANCE BASED MANAGEMENT MATRIX: STAGE 2					Rev: 4	pg 1 of 2
SYSTEM		QUALITY	SCHEDULE	CUSTOMER	LEADERSHIP			
Pattern a. JMS/ JMS/NO Interest SYSTEM Quality a. San Jose Operations b. Allen	COST	PAC Applied Quality Capability Quality System Impl.						
Engineering		Business Development Technical Services		Customer Satisfaction	Leadership			Safety Staffing Employee Involvement
		Technical Capability						
Manufacturing a. San Jose b. Allen	S&O/NO Interest M113 Prod. Eval Quality Improvement New Prod. Transfer Managing R&D Performance Managing to Budget Manufacturing Mfg. Systems	Component Mfg Approval Efficient Quality Design	Reliability Performance Managing Mfg Process	Customer Satisfaction				
c. Plant 7		Manufacturing Process						
		Manufacturing Estimates	Cost & Schedule Control					Safety Management
Procurement a. San Jose b. Allen	P&O/NO Interest Inventory Management	Supplier Audit S&O Customer Interface	P.O. Placement	P.O. Follow Up				Employee Development
		Supplier Certification	Supplier Capabilities					
Contracts	Contract Proposal Structuring	Information Management	Subcontract Control	Plan Management	Str. Contract Admin			Skills Enhancement
Information Resources	in GSA Cost Reduction Prod. Site Run Maint. Outsourcing Paper Run Status	Convenience Capable Change Mgmt Pkg Computer Aided Response	Just Delivery Monthly PM Computer Aided Response	Customer Sat. Phase 2 Reliable Int. Training				Training All Mgmt 1989 Teams Sales GSA Projects

Figure 15. PBM Matrix:Stage 2 (part 1 of 2)
Source: GSD's Project Manager of Divisional Total Quality.

Yates' office personnel have declined approximately 25 percent over the last 12 months. Regardless of personnel shortages, Lieutenant Colonel Yates is dedicated to continuing to team with GSD on those processes determined critical. [Ref. 11]

C. OVERVIEW OF PBM/PROCAS SYSTEM IMPROVEMENT

As discussed in Chapter IV, GSD measures individual processes on a 10 point index scale. Additionally, the 10 point index scale is broken down into three categories: red, yellow and green. These categories provide GSD and the DPRO with a quick reference to prioritize the selected process(es). The color scheme associated with the 10 point index scale is: [Ref. 25]

COLOR	POINT RANGE
Red	0 to 3
Yellow	4 to 7
Green	8 to 10

Each quarter GSD consolidates the PBM indexes for all systems. This consolidation provides GSD and the DPRO with an overview of Stage 1 and 2 processes. Figures 16 and 17 show first quarter's consolidation for 1993. The value for each system is derived by accumulating the total for each process identified in the PBM Matrix Stage 1 or 2 and then dividing by the total number of measured processes within each system. The overall rating is 8.69 for Stage 1 (Figure 16) compared to 4.02 for Stage 2 (Figure 17). [Ref. 26]

Key Systems										
1	2	3	4	5	6	7	8	9	10	11
Quality Assurance	Engineering	Manufacturing	Procurement	Customer	Marketing	Programs	Human Resources	Financial	Information	Product
1	101	102	17.5	101	6.5	101	102	202	1912	113
2	10.00	10.00	8.75	10.00	6.50	10.00	10.00	9.50	9.42	111.35
3	0.00	10.00	9.00	9.00	4.25	10.00	10.00	7.96	8.57	112.76
4	101	93	24.1	91	6.1	101	91	103	21.7613	8.67
5	10.00	9.00	6.67	9.00	8.00	10.00	9.00	7.25	8.67	8.67
6	101	101	101	62	17.1	101	101	101	6.10	8.00
7	10.00	10.00	10.00	6.00	8.50	10.00	10.00	6.00	8.00	8.00
8	101	102	19.1	32	17.1	91	4.75	101	8.11	87.72
9	10.00	9.50	3.00	8.50	9.00	4.75	10.00	8.00	7.96	87.72
10	101	101	6.1	32	19.1	101	7.1	101	7.10	87
11	10.00	8.00	8.00	9.50	10.00	7.00	10.00	7.00	8.70	87
12	51.004	99.0011	94.004	45.0010	80.004	59.005	50.757	70.0011	82.0009	599.85
Index	9.17	9.83	8.96	8.00	9.83	8.44	10.00	7.91	8.69	8.69

Source: GSD's Project Manager of Divisional Total Quality.

Index	Quantity Available	Key Systems								Index
		1 Engineering Management	2 Manufacturing	3 Procurement	4 Contract Management	5 Information Management	6 Program Management	7 Human Resources	8 Financial Management	
1	510	01	40	02	51	34	172	75	8,4921	98.49
2	320	02	80	01	33	73	132	52	4,818	74.5
3	270	01	40	01	11	44	212	46	22,1718	83.17
4	51	50	00	01	12	22	121	21	2,549	29.5
5	01	51	40	01	12	00	00	01	26	12
6	01	51	40	01	11	01	50	00	05	15
7	115,003	15,006	34,000	8,007	12,0010	16,0014	48,007	18,0013	41,8477	309.84
8	500	400	000	1,71	1,60	4,84	2,57	3,22	4.02	

Source: GSD's Project Manager of Divisional Total Quality.

This difference is expected because Stage 1 began in January 1992, while Stage 2 only started in January 1993. However, Stage 2 is .6 better at this time than Stage 1 was at a similar level of maturity. Moreover, Stage 2 has an additional eight processes to consider. Figure 18 compares Stage 1's evolutionary success to Stage 2.

As indicated in Figure 18, GSD didn't initially expect to attain an 8 to 10 point overall average for each stage. Instead GSD and the DPRO realized process improvements take time when moving from a functional to a process orientation. [Refs. 11 and 18]

D. MEASUREMENT OF PROCAS SUCCESS

Currently DCMC is reviewing all corporations involved with PROCAS and asking for their total return on investment. This information will be used to demonstrate PROCAS's benefits to the Director of the Defense Logistics Agency (DLA) and key personnel in the Office of the Secretary of Defense. [Ref. 27] In GSD's case, an accurate return on investment would be a challenge. It would be extremely difficult for GSD to distinguish between PROCAS and TQM initiatives prior to PROCAS. GSD's TQM initiatives were implemented via comprehensive employee training, TQM staffing, and through various systems enhancements. These efforts all facilitate PROCAS. This complicates separating TQM from PROCAS. [Ref. 18]

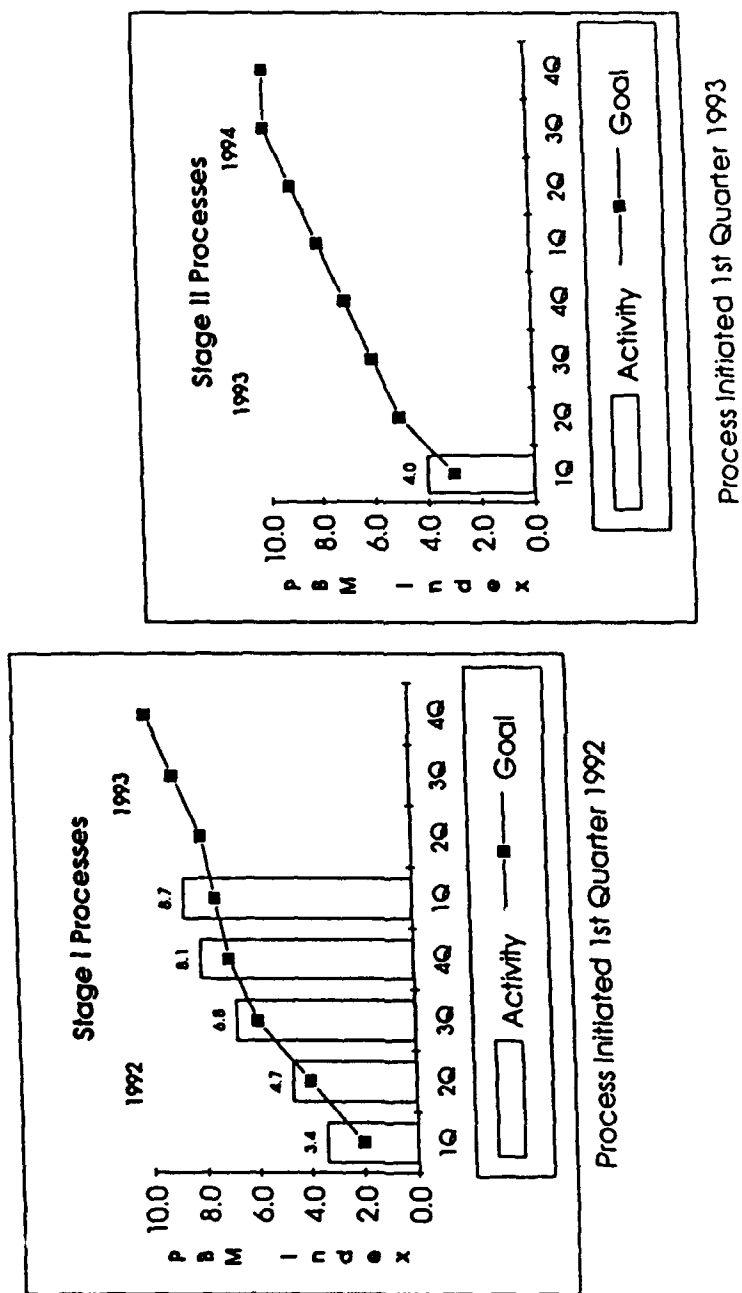


Figure 18. Stage 1 versus Stage 2
 Source: GSD's briefing charts to Mr. Pope, DCMC's PROCAS Project Manager on 27 September 1993.

However, GSD's TQM efforts and DCMC's PROCAS Program have had significant results for GSD and the Government:

1. GSD has reduced their Cost of Quality from 8.5% of sales in 1989 to 4.8% in 1992.
2. Labor hours per vehicle on the BFV have been reduced from 2,224 to 2,003 hours per vehicle.
3. The learning curve on the first six AGS units is projected to require 73% less direct labor hours as compared to the equivalent BFV start up.
4. The time to process Engineering Change Proposal (ECP) requests has decreased from sixteen months to ten months on non- complex ECPs. For complex ECPs, the time has decreased from forty three months to fourteen months.
5. The overall division safety record has improved. The lost work day injury rate has dropped from 3.86 in 1989 to .36 in 1992. This drop has improved attendance in the various shops from 94.7% in 1989 to better than 97% at the end of 1992. [Ref. 19]

The DPRO has seen additional significant results between January 1990 and July 1993:

1. In contract management, proposal preparation deficiencies were reduced from 10.4 to 3.2.
2. BFV deficiencies in functional inspections and tests were reduced from 9.6 to 5.5 per vehicle.
3. BFV deficiencies in the final process inspection were reduced from 16.1 to 4. An improvement of 75%. [Ref. 26]

Currently Lieutenant Colonel Yates' financial analyst is attempting to quantify the Government's return on investment from these successes. This will enable Lieutenant Colonel Yates' team to quantify the benefits of PROCAS into a measurable and understandable form. GSD reluctance to

quantify the results of PROCAS will be addressed later in Chapter VI.

E. RELATIONSHIP OF THE GOVERNMENT AND GSD

The PROCAS Program's primary objective is to improve quality and productivity in key processes. As discussed earlier, structuring processes to improve/increase quality and productivity generates cost savings. From the DPRO's perspective, major cost savings at FMC are attributed to the new atmosphere of **communication** and **cooperation** between the DPRO and GSD across organizational boundaries. [Ref. 11] Despite the declining defense budget, PROCAS has served as an effective tool for improving the DPRO's and GSD's relationship. Hopefully, this cooperative environment will assist the DPRO and GSD during future contract close-outs.

F. SUMMARY

Since implementing their PBM (PROCAS) objectives and their TQM efforts, GSD has experienced good relations with the DPRO. This relationship has enabled GSD to align their PBM philosophy to DCMC's PROCAS program and implement measurements focusing on cost, quality and schedule. This relationship has improved processes and more importantly the organization as a whole. By improving GSD's **total** organization, the DPRO will realize several benefits:

- a. Reduced program risk.

- b. Improved ability to ensure contractor compliance with regulations.
- c. Improved ability to assist in correcting identified problems.
- d. Improvements in the overall execution of any program under its responsibility.

GSD and the DPRO have clearly committed their resources and efforts to PROCAS. GSD and the DPRO realize success requires several ingredients. GSD and the DPRO must be flexible and adaptable. Success requires a great deal of planning. Education is also important. Process changes/improvements must be accepted by both management chains. Finally, teamwork is the essential ingredient for success.

VI. ANALYSIS OF PROCAS

A. INTRODUCTION

The Government's procurement process has the following objective:

To acquire supplies and services of the desired quality, in a timely manner, at fair and reasonable prices. [Ref. 28:p. 1-3]

With PROCAS, the DCMC is attempting to take the Government's procurement process one step further. PROCAS establishes an atmosphere of mutual respect, trust, and professionalism as the Government and the contractor work toward common goals. As discussed in Chapter III, PROCAS enables the Government and the contractor to **identify** key contractor processes of joint interest and establish appropriate metrics to **improve** the effectiveness and efficiency of performance on contract requirements. PROCAS will help ensure that the ultimate customer receives quality products and services. [Ref. 5:p. 1] This chapter will analyze the PROCAS Program's effectiveness in promoting contractor efficiency.

B. GOVERNMENT OPTIMIZATION

Regardless of contract type, fixed-price or cost reimbursable, the Government's objective is to secure needed supplies and services from responsible sources at fair and

reasonable prices resulting in the **lowest ultimate** overall cost to the Government. [Ref. 28:p. 2-1] Through PROCAS, DCMC hopes to lower a contractor's total costs. [Ref. 29] PROCAS uses analytical techniques to evaluate contractor systems, processes and tasks. Improvements will translate into lower costs, thereby lowering a program's life cycle costs. How processes should be measured is outlined by DCMC below:

Fundamental to PROCAS are clearly defined and objectively measured levels of performance. The development of these process measures should be a team effort between the Government and the contractor. Data should be recorded as events occur and collected at key process points to support evaluation of a process. When a contractor's existing data can be used to support process analysis that data should be used. It should provide knowledge that supports proactive efforts to prevent the production of defects, noncompliance, performance problems, and customer dissatisfaction. [Ref. 5:p. 4]

DCMC's PROCAS Program enables the Government to expand opportunities for continuous process improvement to reduce a contract's life cycle costs. However, it remains to be seen if these cost reductions will translate into contractor efficiency! Identifying the appropriate process, understanding the process, selecting the appropriate metrics, and measuring/analyzing the process are critical steps. Teamwork in process selection assumes that tradeoffs can be made between labor, capital, and raw material that will offer reduced process costs. Moreover, as the Government becomes increasingly aware of a contractor's processes, this knowledge may identify cost discrepancies (i.e., cost padding).

C. MEASURING PROCAS EFFICIENCY

PROCAS emphasizes improving production/manufacturing processes. Naturally as a contractor's efficiency increases, production/manufacturing costs are assumed to decrease. This reduces total costs.

How can the Government measure a contractor's process(es) improvements with PROCAS? The Cobb-Douglas production model, $Q = AL^aK^bM^c$, could be used to formulate production functions. In this model, Q is the quantity produced, L is the amount of labor, K is the amount of capital, M is the amount of raw materials, and A, a, b, and c are parameters to be estimated. [Refs. 30:p. 72 and 31:p. 373] Taking the partial derivatives with respect to L, K, and M, provides the marginal product of each resource. The marginal product shows how output expands as the quantity of one input increases, holding other inputs at a constant level. Once derived, the marginal products can be used in conjunction with input prices to determine the most efficient mix of resources for a particular process. [Refs. 30:p. 73 and 31:p. 293] Unfortunately, the production model only demonstrates the various combinations of inputs necessary for the contractor to produce a given output. Not knowing a contractor's costs, the Government can't determine whether the contractor is operating efficiently.

What prevents the Government from having the required information to determine contractor efficiency? Analyzing the

PROCAS indicates that DCMC's program will not induce an efficient allocation of resources to a contractor's production processes. There are two reasons for this conclusion. First, contractors can increase shortrun profits by improving technical efficiency to decrease production costs. However, as the contractor reveals its costs, their future prices will be adjusted. This reduces potential future profits. The reduced profit for the contractor will deter them from long term participation in the program. This explains why GSD may be reluctant to provide DCMC with a return on investment. Second, an efficient allocation will not occur because contractors and the Government have different objectives. The Government's objective in procurement is to minimize the cost of a contract while maintaining the required end item's quantity and quality. A contractor's objectives, on the other hand, are profit motivated for its stockholders and employees (job security). Because of the self-interest goals of defense contractors, the Government will never have complete information of a contractor's production process(es). This lack of information will give rise to an **asymmetric** environment.

This asymmetric information will cause a future challenge for the Government. Contractors are different throughout the defense industry and the challenge is to create an incentive that is compatible/desired by most contractors. What incentives can/should the Government use to encourage

contractor efficiently? The next section will discuss this issue.

D. EFFICIENCY THROUGH INCENTIVE(S)

Contract structure is a key area to evaluate when identifying effective incentives to promote efficiency. One of the easiest ways to motivate a contractor is through incentive type contracts. The two types of incentive contracts that involve cost factors are:

1. Cost-Plus-Incentive-Fee (CPIF). Used in advanced engineering, systems development, and first production contracts when uncertainties of performance preclude a fixed-price contract but are not so great as to require a cost-plus-fixed-fee contract. A target cost and a target fee are established, together with minimum and maximum fees. Cost overruns and underruns are shared in accordance with a negotiated formula until the minimum or maximum fee is reached. There is no ceiling price.
2. Fixed-Price-Incentive-Firm (FPIF). Used in much the same way as CPIF, but where there is less uncertainty in establishing a total ceiling price. The FPIF has the same characteristics as a CPIF except that a ceiling price is established and there are no minimum or maximum fees. [Ref. 32:p. 5-29]

Why would Government buying offices prefer cost-reimbursement or fixed-price incentive type contracts? Incentive type contracts motivate the defense contractor to minimize costs and share in the risk of unforeseen cost increases. As discussed above, with an incentive contract, the Government pays a predetermined percent of overruns if actual costs exceed projected costs. The contractor is required to pay the remaining portion of the overrun. Requiring the defense

contractor to share in cost overruns encourages the contractor to be more efficient. However, if the Government pays some of the overrun, it will not necessarily make the contractor maximize efficiency.

E. THE BEST STRATEGY FOR EFFICIENCY

The best strategy in creating contractor efficiency is for the competitive market to maximize economic efficiency. To maximize economic efficiency, the competitive market must have three essential characteristics: [Ref. 33:p. 6]

1. There are many firms competing.
2. That no individual firm can affect the market price by increasing or decreasing its output.
3. Firms retain 100% of their profit.

The most important characteristic is that firms retain 100% of their profit. Retaining profit provides the defense contractor the motivation to change production process(es), thereby becoming more technically efficient. This technical efficiency involves minimizing production costs. As more defense contractors compete, the **successful** contractors will be those who can produce at the least cost with the highest quality. Therefore, in a competitive market, PROCAS is not required to promote efficiency.

However with the declining defense budget, the competitive market may be reduced to a sole source situation. Without competition, there is no external motivation for a defense

contractor to minimize production costs. In this environment, implementing the PROCAS Program would enable the Government an opportunity to team with the contractor on processes to minimize production costs.

F. SUMMARY

This chapter has described PROCAS's objective: enable the Government and the contractor to **identify** key contractor processes to **improve** the efficiency of performance on contract requirements. DCMC's goal of improved contract efficiency is admirable. Unfortunately, PROCAS is unlikely to succeed because the Government and defense contractors have conflicting objectives. These conflicting objectives will lead to an asymmetric situation there-by creating an implementation problem. PROCAS is likely to have a limited impact on contractor efficiency. To improve contractor efficiency, the Government would have to increase its use of incentive type contracts. Unfortunately, Government cost sharing in incentive contracts reduces a contractor's incentive to be efficient.

The best approach to maximize efficiency is through the competitive market system. In a competitive market system, contractors make autonomous decentralized decisions in establishing process improvements and informational efficiency. Market price is not affected by the actions of a single contractor. Therefore, contractors have an incentive

to improve their processes. By defense contractors seeking to maximize their own profits, they minimize production costs and promote a more efficient allocation of resources. However, in the sole source environment, PROCAS could be a **valuable asset**. PROCAS could provide an external motivation for a contractor to minimize production costs.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The Defense Contract Management Command's PROCAS Program at GSD and the DPRO appears to be an effective method for identifying critical processes. However, the strongest impact of PROCAS is the overwhelming commitment of GSD and the DPRO to the program. PROCAS has provided the foundation for improving processes but more importantly it has reduced program risk.

The PROCAS Program has not only heightened process awareness but it has also improved relations between GSD and the DPRO. In addition to the teaming success at GSD, other major defense contractors including TRW, Magnavox, Martin Marietta, Northrop, and Hughes have reported similar success. As a result of these successes, other defense companies are anxious to implement the program. Government proponents are pleased thus far with industry's support, as reflected in the following quotes from Navy Rear Admiral Leonard Vincent, Commander of the Defense Contract Management Command and Colonel J. Wayne Shattuck, United States Air Force, DPRO Commander at Northrop:

PROCAS is our prime mover, the initiative with the greatest potential to move industry and DCMC through the 90s as a team, with concrete benefits to both.

PROCAS promotes a more objective, less adversarial relationship between government and industry. The measurement clears up communication problems. [Ref. 21:p. 10]

As a process improvement program, PROCAS provides a tremendous opportunity to enhance a defense contractor's performance, and reduce and improve Government oversight by shifting focus from mature to newly identified processes. In this current environment of intense congressional oversight, combined with budgetary constraints, a positive defense industry image could help maintain funding in important programs (i.e., shipping and aircraft) thereby protecting specific defense capabilities.

B. RECOMMENDATIONS

Both FMC and the DPRO have gained from an atmosphere of increased communication at GSD in San Jose, California. Currently, the monetary benefits compared to invested costs are unknown. However, it is clear that the benefits of the PROCAS Program to the Government and GSD will continue as long as their commitment to quality, reduced process cost, and schedule are maintained. Therefore, the DPRO should continue to actively support and promote PROCAS at GSD.

GSD is the sole source contractor on many major programs. This research has shown that Government teaming with a sole source contractor will improve efficiency. However, if

adequate competition exists, the Government should allow market forces to establish contractor efficiency.

DCMC should continue to educate defense contractors and Government personnel within its command of PROCAS's benefits. Awareness through continuous training will establish the values required for PROCAS success.

DCMC should establish a recognition program for those DPROs and DCMAOs who successfully team with contractors. Success recognition can be measured from a return on investment perspective or simply recognizing a contractor and a DPRO/DCMAO Commander working together to improve the quality of the product for their customer.

C. ANSWERS TO THE RESEARCH QUESTIONS

To what extent is DCMC's PROCAS Program reducing Government oversight and increasing Government/contractor communications?

At FMC in San Jose, GSD and DPRO officials have together identified critical processes in key systems within GSD. This joint teaming has enabled the DPRO to more effectively allocate resources to other critical areas of a contract. Currently, the DPRO's general oversight has not been reduced but merely shifted to other key processes. However, as more critical processes become stable (mature), the DPRO will be able to significantly reduce oversight throughout GSD.

The relationship between the Government and GSD has improved significantly and again teaming is the reason for this success. Teaming has enabled GSD and the DPRO to work out problems through scheduled and impromptu meetings where the focus is on objective data and not subjectivity. By staying away from subjectivity, the adversarial relationship between GSD and the DPRO has been considerably reduced.

What are the essential elements of the PROCAS Program and how has the program been implemented at GSD?

The PROCAS Program is part of DCMC's philosophy to improve quality through continuous process improvement(s). An eight step process for PROCAS has been identified: Government planning, teaming agreement, team planning, process selection, understanding the process, selecting the appropriate metrics, measuring/analyzing/managing information, and adjusting management emphasis. The PROCAS Program at GSD was easily implemented. This accomplishment is attributed to GSD's TQM philosophy. TQM is consistent and compatible with PROCAS. Together with the cognizant DPRO, GSD is pursuing the principles of PROCAS by establishing PBM Matrix: Stages 1 and 2. Future PBM Matrix Stages will be developed as current stages demonstrate to GSD and the Government that the processes are mature.

To what extent has the PROCAS Program changed the processes at GSD?

There are three areas in which PROCAS changed the processes at GSD. First, PROCAS **focused** on those processes of greatest concern to GSD and to the DPRO. Secondly, this focus moved process oversight from the traditional approach of detection and correction to one of prevention and continuous improvement. Finally, PROCAS enabled GSD and the DPRO to use objective data to measure, analyze and manage critical processes.

To what extent has the PROCAS Program changed the way the cognizant DPRO reviews GSD's processes?

The PROCAS Program has created a cooperative environment in which the DPRO and GSD jointly evaluate problem areas within critical processes, resulting in a mutually beneficial solution. However, this mutual solution does not eliminate the DPRO's requirements of a contract nor does it imply the DPRO can stray from the requirements outlined in the FAR or the Department of Defense Federal Acquisition Regulation Supplement (DFARS).

Is measuring the return on investment of PROCAS beneficial?

Measuring the return on investment of PROCAS will not be beneficial to the Government. If defense contractors are **required** to submit a return on investment, they may manipulate process resource allocations. Rearranging resources allows defense contractors the flexibility to implement process changes without incurring actual process improvements.

Invoking flexibility is the defense contractor's way of self-preservation because industry may feel, as they reveal costs, future contract prices will be affected. This would reduce potential profits. The possibility of reduced profit will deter the defense industry from participating in the program. The Government will see increased benefits of PROCAS if the program is promoted as working together in a teaming approach versus a relationship mandating a return on investment. Mandating a return on investment only perpetuates an adversarial relationship between Government and the defense industry.

What conclusions may be drawn from GSD's implementation of the PROCAS Program that could benefit Department of Defense Contractors?

The PROCAS Program created a new atmosphere of open **communication** and **cooperation**. This working relationship enabled both GSD and the Government to work more effectively and efficiently there-by improving total quality and lowering life cycle costs.

From the GSD and Government experience, PROCAS can benefit Department of Defense contractors by allowing them to work with the Government to become not only more process efficient, but to improve the quality of their product(s). Producing high quality products at low cost will be the defense industry's tangible assets if the defense downsizing forces

them to compete in the commercial market. Hopefully, PROCAS can prepare defense contractors for DOD's eventual downsizing.

D. AREAS OF FURTHER RESEARCH

The PROCAS Program at GSD has provided significant benefits to the Government. Increased knowledge in GSD's various systems has enabled the DPRO to focus on critical processes and assign personnel more effectively. However, the monetary benefits of improved processes is unknown. At the time of this research, the DPRO's financial analyst is attempting to quantify cost savings attributable to PROCAS. As more cost data becomes available, additional research on the return on investment of participating contractors would be useful in determining the monetary effectiveness of the program.

The European Community trade agreement has resulted in an International Quality Standard referred to as ISO 9000. This international standard demands that a company commit to and define a quality system. To maintain a competitive position, more and more American companies are looking towards ISO 9000 as a way of lowering costs while improving their quality. [Ref. 34:p. 6] As more companies become involved in ISO 9000, additional research comparing ISO 9000 and PROCAS would be beneficial to determine if **quality** standards can be attained without Government oversight.

APPENDIX A. LIST OF ABBREVIATIONS

ACO	Administrative Contracting Officer
AGS	Armored Gun System
BFV	Bradley Fighting Vehicle
CAO	Contract Administration Office
CAR	Corrective Action Report
CAS	Contract Administrative Services
CIO	Continuous Improvement Opportunity
CPIF	Cost-Plus-Incentive-Fee
CPSR	Contractor Purchasing System Review
CRAG	Contractor Risk Assessment Guide
DCAA	Defense Contract Audit Agency
DCAS	Defense Contract Administrative Services
DCMAO	Defense Contract Management Area Operations
DCMC	Defense Contract Management Command
DCMD	Defense Contract Management District
DFARS	Department of Defense FAR Supplement
DLA	Defense Logistics Agency
DMR	Defense Management Report
DOD	Department of Defense
DODIG	Department of Defense Inspector General
DPRO	Defense Plant Representative Office
ECP	Engineering Change Proposal
FAR	Federal Acquisition Regulation

FPIF	Fixed-Price-Incentive-Firm
FMC	Corporate Name
GAO	General Accounting Office
GSD	Ground Systems Division
IQUE	In-Plant Quality Evaluation
ISO 9000	International Quality Standard
MLRS	Multiple Launch Rocket System
NCMA	National Contract Management Association
OSD	Office of the Secretary of Defense
PAT	Project Action Team
PBM	Performance Based Management
PROCAS	Process Oriented Contract Administration Services
SECDEF	Secretary of Defense
TQM	Total Quality Management
USD(A&T)	Under Secretary of Defense (Acquisition and Technology)

APPENDIX B

PART 42—CONTRACT ADMINISTRATION

42.301

CAS administration only. Instructions for marking and distributing these contracts are provided in 42.301(c).

(b) Contracting offices or CAO's may request supporting contract administration under 42.304 for contracts for which they have contract administration responsibility. However, if a substantial proportion of the normal contract administration functions listed in 42.302(a) are to be requested, an official above the contracting officer's level shall review the validity of retaining administration while requesting extensive supporting contract administration.

42.304 Supporting contract administration.

(a) A CAO assigned a contract for administration under 42.302 or a contracting office retaining administration under 42.303 may request supporting contract administration from the CAO cognizant of the contractor location where performance of specific contract administration functions is required. The request shall (1) be in writing, (2) clearly state the specific functions to be performed, and (3) be accompanied by a copy of pertinent contractual and other necessary documents.

(b) The prime contractor is responsible for managing its subcontracts. The CAO's concern with subcontracts is normally limited to evaluating the prime contractor's management of them (see Part 44). Therefore, supporting contract administration shall not be used for subcontracts unless (1) the Government would otherwise incur undue cost, (2) successful completion of the prime contract is threatened, or (3) it is authorized under paragraph (c) below or elsewhere in this regulation.

(c) For major system acquisitions (see Part 34), the contracting officer may designate certain high-risk or critical subsystems or components for special surveillance (see 44.205) in addition to requesting supporting contract administration. This surveillance shall be conducted in a manner fully consistent with the policy of calling upon the cognizant CAO to perform contract administration functions at a contractor's facility (see Subpart 42.1).

42.305 Designation of the paying office.

If the information is available, the contracting officer shall enter on the contract the name and address of the office designated under agency procedures to make payments on the contract. Unless agency acquisition regulations otherwise provide, the assignment of contract administration to a CAO does not affect the designation of the paying office.

42.306 Reassignment of contract administration.

(a) The administrative contracting officer at the CAO of initial assignment shall reassign a contract for administration when the need for reassignment results from (1) an incorrect initial assignment, (2) organizational transfer of the cognizant CAO, (3) establishment or disestablishment of a CAO, or (4) a change in a CAO's geographical responsibility.

(b) The contracting officer at the contracting office shall reassign a contract for administration when reasons other than those in paragraph (a) above make reassignment appropriate.

(c) To reassign a contract, the responsible contracting officer shall use a unilateral contract modification. The CAO of initial assignment shall transfer the contract file and necessary supporting documents to the successor CAO.

(d) When warranted by a change in circumstances and approved at a higher level, a contracting officer may recall a contract or function previously assigned for administration.

SUBPART 42.3—CONTRACT ADMINISTRATION OFFICE FUNCTIONS

42.301 General.

When a contract is assigned for administration under Subpart 42.2, the contract administration office (CAO) shall perform contract administration functions in accordance with this regulation, the contract terms, and, unless otherwise agreed upon in formal cross-servicing arrangements (see 42.101(a)), the applicable regulations of the servicing agency.

42.302 Contract administration functions.

(a) The following are the normal contract administration functions to be performed by the cognizant CAO, to the extent they apply, as prescribed in 42.302:

- (1) Review the contractor's compensation structure.
- (2) Review the contractor's insurance plans.
- (3) Conduct post-award orientation conferences.
- (4) Review and evaluate contractors' proposals under Subpart 15.8 and, when negotiation will be accomplished by the contracting officer, furnish comments and recommendations to that officer.
- (5) Negotiate forward pricing rate agreements (see 15.809).
- (6) Negotiate advance agreements applicable to payment of costs under contracts currently assigned for administration (see 31.109).
- (7) Determine the allowability of costs suspended or disapproved as required (see Subpart 42.8), direct the suspension or disapproval of costs when there is reason to believe they should be suspended or disapproved, and approve final vouchers.
- (8) Issue Notices of Intent to Disallow or not Recognize Costs (see Subpart 42.8).
- (9) Establish final indirect cost rates and billing rates for those contractors meeting the criteria for contracting officer determination in Subpart 42.7.
- (10) Prepare findings of fact and issue decisions under the Disputes clause on matters in which the administrative contracting officer (ACO) has the authority to take definitive action.

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(11) In connection with Cost Accounting Standards (see Part 30)—

(i) Determine the adequacy of the contractor's disclosure statements;

(ii) Determine whether disclosure statements are in compliance with Cost Accounting Standards and Part 31;

(iii) Determine the contractor's compliance with Cost Accounting Standards and disclosure statements, if applicable; and

(iv) Negotiate price adjustments and execute supplemental agreements under the Cost Accounting Standards clauses at 52.230-3, 52.230-4, and 52.230-5.

(12) Review and approve or disapprove the contractor's requests for payments under the progress payments clause.

(13) Make payments on assigned contracts when prescribed in agency acquisition regulations (see 42.205).

(14) Manage special bank accounts.

(15) Ensure timely notification by the contractor of any anticipated overrun or underrun of the estimated cost under cost-reimbursement contracts.

(16) Monitor the contractor's financial condition and advise the contracting officer when it jeopardizes contract performance.

(17) Analyze quarterly limitation on payments statements and recover overpayments from the contractor.

(18) Issue tax exemption certificates.

(19) Ensure processing and execution of duty-free entry certificates.

(20) For classified contracts, administer those portions of the applicable industrial security program designated as ACO responsibilities (see Subpart 4.4).

(21) Issue work requests under maintenance, overhaul, and modification contracts.

(22) Negotiate prices and execute supplemental agreements for spare parts and other items selected through provisioning procedures when prescribed by agency acquisition regulations.

(23) Negotiate and execute contractual documents for settlement of partial and complete contract terminations for convenience, except as otherwise prescribed by Part 49.

(24) Negotiate and execute contractual documents setting cancellation charges under multiyear contracts.

(25) Process and execute novation and change of name agreements under Subpart 42.12.

(26) Perform property administration (see Part 45).

(27) Approve contractor acquisition or fabrication of special test equipment under the clause at 52.245-18, Special Test Equipment.

(28) Perform necessary screening, redistribution, and disposal of contractor inventory.

(29) Issue contract modifications requiring the con-

tractor to provide packing, crating, and handling services on excess Government property. When the ACO determines it to be in the Government's interests, the services may be secured from a contractor other than the contractor in possession of the property.

(30) In facilities contracts—

(i) Evaluate the contractor's requests for facilities and for changes to existing facilities and provide appropriate recommendations to the contracting officer;

(ii) Ensure required screening of facility items before acquisition by the contractor;

(iii) Approve use of facilities on a noninterference basis in accordance with the clause at 52.245-9, Use and Charges;

(iv) Ensure payment by the contractor of any rental due; and

(v) Ensure reporting of items no longer needed for Government production.

(31) Perform production support, surveillance, and status reporting, including timely reporting of potential and actual slippages in contract delivery schedules.

(32) Perform pre-award surveys (see Subpart 9.1).

(33) Advise and assist contractors regarding their priorities and allocations responsibilities and assist contracting offices in processing requests for special assistance and for priority ratings for privately owned capital equipment.

(34) Monitor contractor industrial labor relations matters under the contract; apprise the contracting officer and, if designated by the agency, the cognizant labor relations advisor, of actual or potential labor disputes; and coordinate the removal of urgently required material from the strikebound contractor's plant upon instruction from, and authorization of, the contracting officer.

(35) Perform traffic management services, including issuance and control of Government bills of lading and other transportation documents.

(36) Review the adequacy of the contractor's traffic operations.

(37) Review and evaluate preservation, packaging, and packing.

(38) Ensure contractor compliance with contractual quality assurance requirements (see Part 46).

(39) Ensure contractor compliance with contractual safety requirements.

(40) Perform engineering surveillance to assess compliance with contractual terms for schedule, cost, and technical performance in the areas of design, development, and production.

(41) Evaluate for adequacy and perform surveillance of contractor engineering efforts and management systems that relate to design, development, production, engineering changes, subcontractors, tests, management of engineering resources, reliability and maintainability,

PART 42—CONTRACT ADMINISTRATION

42.303

data control systems, configuration management, and independent research and development.

(42) Review and evaluate for technical adequacy the contractor's logistics support, maintenance, and modification programs.

(43) Report to the contracting office any inadequacies noted in specifications.

(44) Perform engineering analyses of contractor cost proposals.

(45) Review and analyze contractor-proposed engineering and design studies and submit comments and recommendations to the contracting office, as required.

(46) Review engineering change proposals for proper classification, and when required, for need, technical adequacy of design, producibility, and impact on quality, reliability, schedule, and cost; submit comments to the contracting office.

(47) Assist in evaluating and make recommendations for acceptance or rejection of waivers and deviations.

(48) Evaluate and monitor the contractor's procedures for complying with procedures regarding restrictive markings on data.

(49) Monitor the contractor's value engineering program.

(50) Review, approve or disapprove, and maintain surveillance of the contractor's purchasing system (see Part 44).

(51) Consent to the placement of subcontracts.

(52) Review, evaluate, and approve plant or division-wide small and small disadvantaged business master subcontracting plans.

(53) Obtain the contractor's currently approved company- or division-wide plans for small business and small disadvantaged business subcontracting for its commercial products, or, if there is no currently approved plan, assist the contracting officer in evaluating the plans for those products.

(54) Assist the contracting officer, upon request, in evaluating an offeror's proposed small business and small disadvantaged business subcontracting plans, including documentation of compliance with similar plans under prior contracts.

(55) By periodic surveillance, ensure the contractor's compliance with small business and small disadvantaged business subcontracting plans and any labor surplus area contractual requirements; maintain documentation of the contractor's performance under and compliance with these plans and requirements; and provide advice and assistance to the firms involved, as appropriate.

(56) Maintain surveillance of flight operations.

(57) Assign and perform supporting contract administration.

(58) Ensure timely submission of required reports.

(59) Issue administrative changes, correcting errors or omissions in typing, contractor address, facility or activity code, remittance address, computations which

do not require additional contract funds, and other such changes (see 43.101).

(60) Cause release of shipments from contractor's plants according to the shipping instructions. When applicable, the order of assigned priority shall be followed; shipments within the same priority shall be determined by date of the instruction.

(61) Obtain contractor proposals for any contract price adjustments resulting from amended shipping instructions. ACO's shall review all amended shipping instructions on a periodic, consolidated basis to assure that adjustments are timely made. Except when the ACO has settlement authority, the ACO shall forward the proposal to the contracting officer for contract modification. The ACO shall not delay shipments pending completion and formalization of negotiations of revised shipping instructions.

(62) Negotiate and/or execute supplemental agreements, as required, making changes in packaging sub-contractors or contract shipping points.

(63) Cancel unilateral purchase orders when notified of nonacceptance by the contractor. The ACO shall notify the contracting officer when the purchase order is canceled.

(64) Negotiate and execute one-time supplemental agreements providing for the extension of contract delivery schedules up to 90 days on contracts with an assigned Criticality Designator of C (see 42.1105). Notification that the contract delivery schedule is being extended shall be provided to the contracting office. Subsequent extensions on any individual contract shall be authorized only upon concurrence of the contracting office.

(65) Accomplish administrative closeout procedures (see 4.804-5).

(66) Determine that the contractor has a drug-free workplace program and drug-free awareness program (see Subpart 23.5).

(67) Support the program, product, and project offices regarding program reviews, program status, program performance and actual or anticipated program problems.

(b) The CAO shall perform the following functions only when and to the extent specifically authorized by the contracting office:

(1) Negotiate or negotiate and execute supplemental agreements incorporating contractor proposals resulting from change orders issued under the Changes clause. Before completing negotiations, coordinate any delivery schedule change with the contracting office.

(2) Negotiate prices and execute priced exhibits for unpriced orders issued by the contracting officer under basic ordering agreements.

(3) Negotiate or negotiate and execute supplemental agreements changing contract delivery schedules.

(4) Negotiate or negotiate and execute supplemental agreements providing for the deobligation of unex-

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pending dollar balances considered excess to known contract requirements.

(5) Issue amended shipping instructions and, when necessary, negotiate and execute supplemental agreements incorporating contractor proposals resulting from these instructions.

(6) Negotiate changes to interim billing prices.

(7) Negotiate and define adjustments to contract prices resulting from exercise of an economic price adjustment clause (see Subpart 16.2).

(8) Issue change orders and negotiate and execute resulting supplemental agreements under contracts for ship construction, conversion, and repair.

(9) Execute supplemental agreements on firm-fixed-price supply contracts to reduce required contract line item quantities and deobligate excess funds when notified by the contractor of an inconsequential delivery shortage, and it is determined that such action is in the best interests of the Government, notwithstanding the default provisions of the contract. Such action will be taken only upon the written request of the contractor and, in no event, shall the total downward contract price adjustment resulting from an inconsequential delivery shortage exceed \$250.00 or 5 percent of the contract price, whichever is less.

(10) Execute supplemental agreements to permit a change in place of inspection at origin specified in firm-fixed-price supply contracts awarded to nonmanufacturers, as deemed necessary to protect the Government's interests.

(c) Any additional contract administration functions not listed in 42.302(a) and (b), or not otherwise delegated, remain the responsibility of the contracting office.

SUBPART 42.4—CORRESPONDENCE AND VISITS

42.401 Contract correspondence.

(a) The contracting officer (or other contracting agency personnel) normally shall (1) forward correspondence relating to assigned contract administration functions through the cognizant contract administration office (CAO) to the contractor, and (2) provide a copy for the CAO's file. When urgency requires sending such correspondence directly to the contractor, a copy shall be sent concurrently to the CAO.

(b) The CAO shall send the contracting office a copy of pertinent correspondence conducted between the CAO and the contractor.

42.402 Visits to contractors' facilities.

(a) Government personnel planning to visit a contractor's facility in connection with one or more Government contracts shall provide the cognizant CAO with the following information, sufficiently in advance to permit the CAO to make necessary arrangements. Such notification is for the purpose of eliminating duplicative reviews, requests,

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investigations, and audits relating to the contract administration functions in subpart 42.3 delegated to CAO's and shall, as a minimum, include the following (see also paragraph (b) of this section):

(1) Visitors' names, official positions, and security clearances.

(2) Date and duration of visit.

(3) Name and address of contractor and personnel to be contacted.

(4) Contract number, program involved, and purpose of visit.

(5) If desired, visitors to a contractor's plant may request that a representative of the CAO accompany them. In any event, the CAO has final authority to decide whether a representative shall accompany a visitor.

(b) If the visit will result in reviewing, auditing, or obtaining any information from the contractor relating to contract administration functions, the prospective visitor shall identify the information in sufficient detail so as to permit the CAO, after consultation with the contractor and the cognizant audit office, to determine whether such information, adequate to fulfill the requirement, has recently been reviewed by or is available within the Government. If so, the CAO will discourage the visit and refer the prospective visitor to the Government office where such information is located. Where the office is the CAO, such information will be immediately forwarded or otherwise made available to the requestor.

(c) Visitors shall fully inform the CAO of any agreements reached with the contractor or other results of the visit that may affect the CAO.

42.403 Evaluation of contract administration offices.

Onsite inspections or evaluations of the performance of the assigned functions of a contract administration office shall be accomplished only by or under the direction of the agency of which that office is a part.

SUBPART 42.5—POSTAWARD ORIENTATION

42.500 Scope of subpart.

This subpart prescribes policies and procedures for the postaward orientation of contractors and subcontractors through (a) a conference or (b) a letter or other form of written communication.

42.501 General.

(a) A postaward orientation aids both Government and contractor personnel to (1) achieve a clear and mutual understanding of all contract requirements, and (2) identify and resolve potential problems. However, it is not a substitute for the contractor's fully understanding the work requirements at the time offers are submitted, nor is it to be used to alter the final agreement arrived at in any negotiations leading to contract award.

(b) Postaward orientation is encouraged to assist small

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